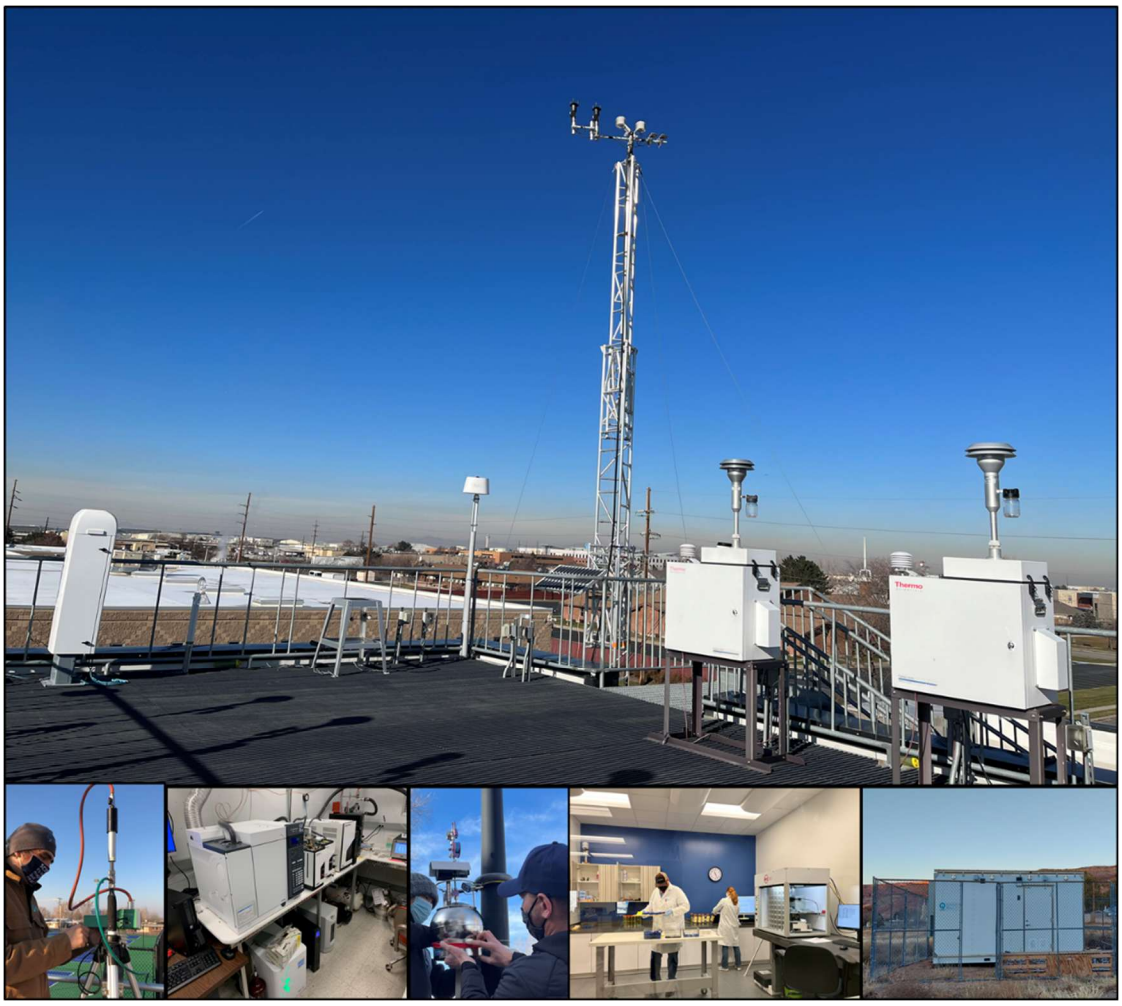
UTAH DEPARTMENT of ENVIRONMENTAL QUALITY

Division of Air Quality

Annual Monitoring Network Plan 2022



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GLOSSARY

DAQ	Division of Air Quality
AQS	Air Quality System (EPA database)
BC	Black Carbon
CBSA	Core-Based Statistical Area
CFR	Code of Federal Regulations
CO	Carbon monoxide
CSN	Chemical Speciation Network
EMP	Enhanced Monitoring Plan
EPA	U.S. Environmental Protection Agency
FEM	Federal Equivalent Method
FRM	Federal Reference Method
LHD	Local Health Department
MSA	Metropolitan Statistical Area
NAAQS	National Ambient Air Quality Standards
NATTS	National Air Toxics Trends Stations
NCore	National Core multi-pollutant monitoring stations
NO	Nitric oxide
NO_2	Nitrogen dioxide
NOx	Reactive nitrogen oxides
NOy	Total reactive nitrogen
O_3	Ozone
PAMS	Photochemical Assessment Monitoring Stations
PAHs	Polycyclic aromatic hydrocarbons
$PM_{2.5}$	Particulate matter with an equivalent diameter less than or equal to 2.5 µm
PM_{10}	Particulate matter with an equivalent diameter less than or equal to 10 µm
ppb	Parts per billion (one part in 10^9)
ppm	Parts per million (one part in 10^6)
SIP	State Implementation Plan
SLAMS	State or Local Air Monitoring Stations
SO2	Sulfur dioxide
SPM	Special Purpose Monitor
µg	Microgram (10^{-6} grams)
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

Each year, the Air Monitoring Section of the Division of Air Quality (DAQ) produces a Monitoring Network Plan in accordance with federal regulations (40 CFR, section 58.10). The purpose of the document is to apprise the stakeholders (public, private, government) and other entities of the current state and the upcoming changes to the State's Air Monitoring Network being operated in compliance with e Code of Federal Regulations 40 Code of Federal Register (CFR) 58. DAQ continually seeks input from the aforementioned parties on improvements to the current level of service or to provide additional accommodations where requested and needed. The Annual Monitoring Network Plan reflects the necessary network changes DAQ implements to enhance the quality, coverage, reliability, and cost efficiency of the division's monitoring efforts.

In 2021-2022, the Air Quality Monitoring Network underwent the following changes:

- The two sites monitoring the Inland Port development: Lake Park (LP), located at 2782 South Corporate Park Dr, West Valley City and Prison Site (ZZ) located at 1480 North 8000 West, Salt Lake City are fully reporting continuous fine particulate matter ($PM_{2.5}$), Black Carbon (BC), nitrous oxide (NO_2), and ozone (O_3).
- The relocation of primary and co-located FRM PM_{10} monitors from Smithfield to Roosevelt started in October 2021 after consultation with EPA, due to land development adjacent to the Smithfield site and more available space and staff time at the Roosevelt site.
- Co-located $PM_{2.5}$ FRM monitors were placed at Near Road, Copperview, Roosevelt and Vernal monitoring sites.
- Spanish Fork (SF) station was relocated in November 2021. This relocation was within a few hundred feet of the old station and does not represent ending the old stations data history nor does it start a new station.
- The DAQ updated the technology used to measure the meteorological variables to sonic anemometer systems (2D sonic wind sensors). Temperature and relative humidity probes and pyranometers to measure incoming solar radiation were also updated.
- Continuous particulate matter PM_{10} monitoring samplers were incorporated to the stations currently monitoring PM_{10} to operate in co-location with FRM filter-based measurements for comparability assessment.

Statement of Compliance

According to the requirement of 40 CFR 58, Subpart B, all stations and monitors deployed within Utah's Air Quality Monitoring Network meet the requirements of appendices A, C, D, and E of the aforementioned subpart. As of 2022, Utah's Air Quality Monitoring Network has no active Prevention of Serious Deterioration (PSD) air monitoring program stations; Appendix B does not apply to any stations or monitors in Utah because this appendix pertains to PSD air monitoring stations.

Primary Monitor Designation

A primary monitor is defined as the one *"identified by the monitoring organization that provides concentration data used for comparison to the NAAQS. For any specific site, only one monitor for each pollutant can be designated in AQS as primary monitor for a given period of time. The primary monitor identifies the default data source for creating a combined site record for purposes of NAAQS comparisons."* (40 CFR 58.1).

Each year, DAQ carefully chooses and designates suitable primary monitors for each monitoring station and each pollutant according to data completeness and integrity. The primary monitors are designated prior to data certification in Q1 of the following year during the regular QC process. Federal Equivalent Method (FEM) $PM_{2.5}$ monitor data was not used prior to January 1, 2015, as it did not meet quality assurance requirements. As of January 1, 2015, FEM $PM_{2.5}$ monitoring was used for data substitution and co-locations as required in 49 CFR Part 50 Appendix N and 40 CFR Part 58 Appendix A 3.2. Table 1 lists the designated Pollutant Occurrence Code (POC) for the primary monitor designations for the year 2021

Table 1. List of designated primary monitors for 2021.

Site name	County	Site ID	POC
Smithfield (SM)	Cache	49-005-0007	1
Harrisville (HV)	Weber	49-057-1003	1
Bountiful (BV)	Bountiful	49-011-0004	1
Copperview (CV)	Salt Lake	49-035-2005	1
Environmental Quality (EQ)	Salt Lake	49-035-3015	1
Hawthorne (HW)	Salt Lake	49-035-3006	4
Herriman (H3)	Salt Lake	49-035-3013	5
Near Road (NR)	Salt Lake	49-035-4002	3
Rose Park (RP)	Salt Lake	49-035-3010	1
Prison Site (ZZ)	Salt Lake	49-035-3016	1
Erda (ED)	Tooele	49-045-0004	1
Lindon (LN)	Utah	49-049-4001	1
Spanish Fork (SF)	Utah	49-049-5010	3
Vernal (V4)	Uintah	49-047-1004	4
Roosevelt (RS)	Duchesne	49-013-0002	3
Enoch (EN)	Iron	49-021-0005	1
Hurricane (HC)	Washington	49-053-0007	3

Network Changes

Changes to the Utah's Air Quality Monitoring Network are intended to improve the effectiveness of monitoring efforts and to ensure compliance with the EPA National Ambient Air Monitoring Strategy. This section of the document contains all changes that were made in 2021 and the changes that are planned for 2022.

2021 Network Changes

- The two sites monitoring the Inland Port development: Lake Park (LP), located at 2782 South Corporate Park Dr, West Valley City and Prison Site (ZZ) located at 1480 North 8000 West, Salt Lake City are fully reporting continuous $PM_{2.5}$, BC, NOx, O_3 and meteorological variables.

- Due to construction at the Spanish Fork (SF) airport, Spanish Fork site was relocated. The site was moved a few hundred feet within the same airport. The relocation was approved by the EPA, the Federal Aviation Administration, and the City of Spanish Fork. The relocated site started reporting data on Nov 1, 2021.

- DAQ relocated the primary and co-located PM_{10} monitors started Oct 1, 2021. The monitors were moved from Smithfield to Roosevelt station. The samplers are reporting data at the new location since Oct 1, 2021.

- $PM_{2.5}$ FRM filter-based monitors were installed at Near Road, Copperview, Roosevelt and Vernal sites to operate in co-location with the continuous $PM_{2.5}$ monitors.

- DAQ updated the technology used to measure the meteorological variables. Previously, the system used to measure the wind direction and speed consist of cup anemometers and vane systems (in all the stations but Roosevelt), but, they were replaced by sonic anemometer systems (2D sonic wind sensors). Temperature and relative humidity probes and pyranometers to measure incoming solar radiation were also updated or included in all the stations.

- Continuous PM_{10} monitoring samplers were incorporated to the stations currently monitoring PM_{10} to operate in co-location with FRM filter-based measurements for comparability assessment and support AQI. Data has been available since January 1, 2022.

- A continuous $PM_{2.5}$ monitor was started at the Price site to support wildfire smoke monitoring. The duration of this monitor is to be determined and may be depended on how the wild fire season turns out in the coming year.

2022 Proposed Network Changes

- The DAQ in coordination with the Local Health Department (LHD), local officials and DAQ modelers selected a suitable location to install a $PM_{2.5}$ monitor within the city limits of Moab. Arrangements for power to be installed are in process and DAQ plans to have this station fully operational in Q4 of 2022 and starting data collection on January 1, 2023.

- A new location for the Brigham City site was selected and DAQ is working on site preparation and for power to be installed. The site will help assess population exposure in this area and will help the forecasters with $PM_{2.5}$ predictions.

- Due to population growth, new monitoring will be conducted to collect baseline pollution data in Summit and Wasatch counties. A new monitoring station is planned for each county to monitor for $PM_{2.5}$, O_3, NO_X and meteorology. Specific locations have yet to be determined

- A second Near Road site is required in the Salt Lake City Metropolitan Statistical Area (MSA). Sites are being considered and evaluated for this in consultation with EPA. The timing of the site is still uncertain and will depend on a number of factors including budget and resources.

- Future new monitoring activities and/or sites will be required in the Wasatch Front in order to meet Enhanced Monitoring Plan (EMP) requirements as EPA has proposed that the Wasatch Front be re-designated to Moderate nonattainment for ozone.

  The DAQ is developing an EMP in fulfillment of federal regulations, 40 CFR Part 58, Appendix D 5(h). These regulations, require that any states with any area designated moderate and above 8-hour O_3 nonattainment, and any state within the Ozone Transport Region (OTR), develop, implement and submit an EMP for O_3 to the regional office of the Environmental Protection Agency (EPA) no later than October 1, 2019, or two years following the effective date of a designation to a classification of Moderate or above O_3 nonattainment.

  The EMP is intended to provide monitoring organizations the flexibility to implement any additional monitoring beyond the minimum requirements for the State and Local Air Monitoring Stations (SLAMS) to complement the needs of their area.

  The DAQ is currently planning on three to six additional monitoring sites along the Wasatch Front. Preliminary areas for these new sites include Erda, near the Lake Park monitoring station and near the Bountiful monitoring site for phase 1. For phase 2, we will look at data needs further north in the Ogden area and further south in the southern Salt Lake County area. Throughout this network expansion we will be conferring with EPA and researchers to ensure the best possible use of resources to generate the most relevant data. These new sites may contain some or all of the following instruments or types of measurements;

1. Hourly averaged speciated volatile organic compounds (VOCs) (PAMS target list compounds),
2. Hourly averaged formaldehyde,
3. Hourly averaged mixing-height measurements,
4. Additional ozone measurements,
5. True NO_2 measurements and/or NO_Y measurements, and
6. Pandora Spectrometry.

There may be additional measurements included in the EMP that could include low cost sensors and other parameters as we get further along. Some of these additional measurements may be collected at existing monitoring sites or will located at new sites as we determine best meets our data needs.

All changes and additions to the monitoring network are contingent upon necessary resources and the approval of EPA.

1.1 Utah Air Quality Monitoring Network

The Air Quality Monitoring Network currently operates monitors at 23 locations statewide. Two of the monitoring sites have been established to fulfill the Utah Senate Bill SB144, which directs the Department of Environmental Quality to establish and maintain monitoring facilities to measure the environmental impact from the Inland Port development project. These sites are the Lake Park Site (LP) and the new Prison Site (ZZ).

The DAQ monitoring stations are strategically situated to measure both local and regional levels of air pollutants, including particulate matter (PM), gaseous pollutants and meteorological variables. Currently, $PM_{2.5}$ is measured at 19 locations, PM_{10} is monitored at seven locations, O_3 is monitored at 20 locations, $NO_X/NO/NO_2$ is measured at nineteen locations, CO is monitored at seven locations and SO_2 at four locations. Fourteen out of nineteen $PM_{2.5}$ monitoring sites and all PM_{10} sites use filter-based equipment, additionally; all the sites monitoring $PM_{2.5}$ and PM_{10} are equipped with continuous monitors. Meteorological parameters, wind speed, wind direction, temperature, relative humidity and solar radiation are measured at most sampling sites. The location and elevation of the monitoring sites, the EPA Air Quality System (AQS) site codes and the measured variables at each station are provided in Table 2 and Table 3.

Moreover, the network includes stations that participate in the National Core (NCore), Speciation Trends Network (STN), Chemical Speciation Network (CSN), Photochemical Assessment Monitoring Stations (PAMS), National Air Toxics Trends (NATTS) and Near-road station EPA monitoring programs.

Data collected at these stations is primarily used for the following objectives:

- Evaluating population exposure to air pollutants
- Tracking the spatial distribution of air pollutants

- Assessing historical trends in air pollution
- Supporting compliance with ambient air quality standards (primary and secondary)
- Supporting air quality models and research studies
- Informing the general public of air pollution levels via mobile apps and web pages
- Developing State Implementation Plans (SIPs) and legislative air pollution control measures
- Tracking the effectiveness of air pollution control strategies
- Activating control measures during high air pollution episodes, such as restricting wood burning during winter-time inversions
- Monitoring of specific emission sources and air pollutants

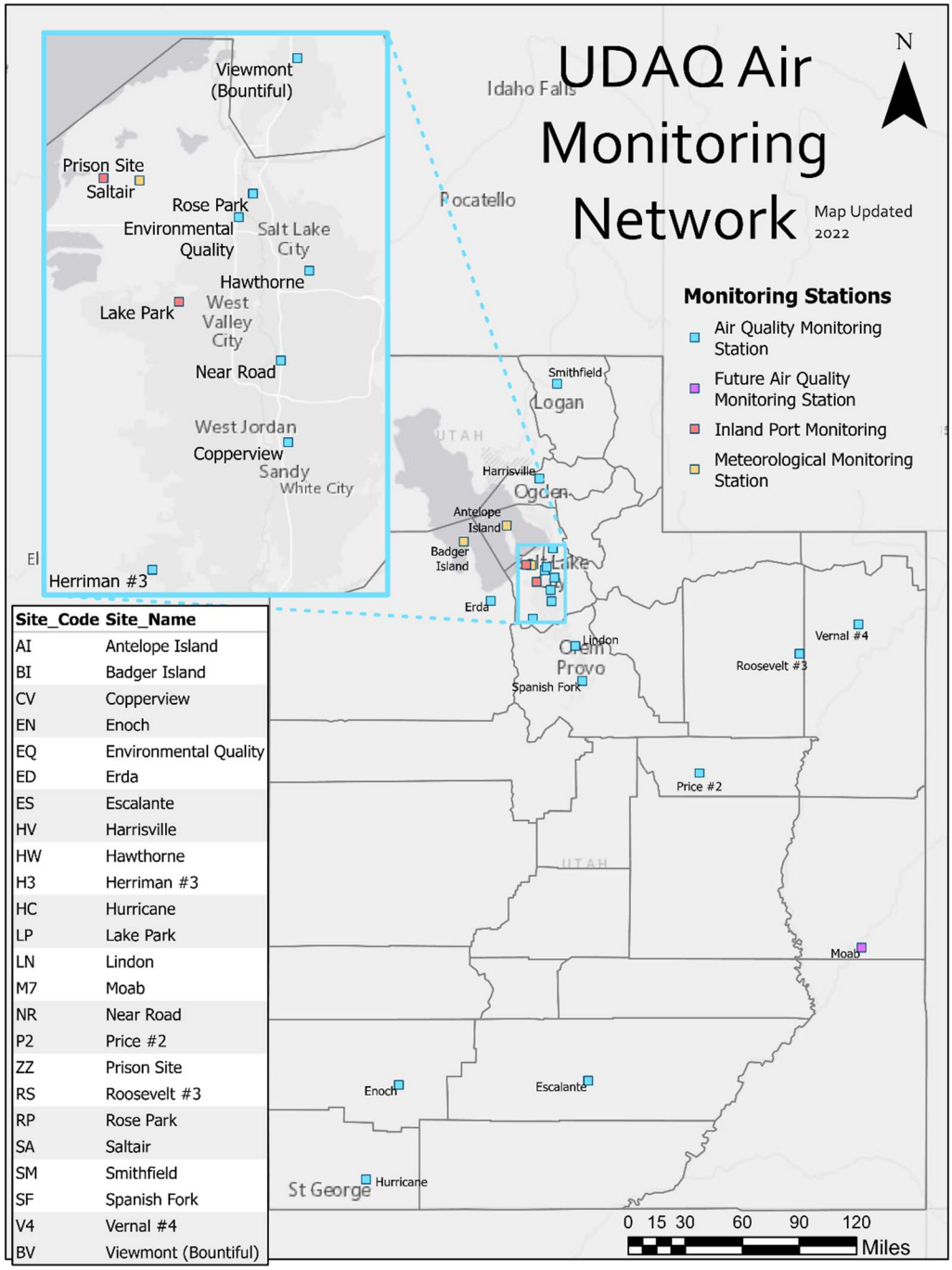
The sampling sites are strategically located to meet the aforementioned monitoring objectives. For instance, some sites are selected to measure PM concentrations in highly populated areas while others are selected to determine the extent of ozone (and its precursors) transport from the Wasatch Front to the Uinta Basin. The DAQ is continually working to optimize the monitoring instruments in its network.
A list of the methods and equipment used to measure the parameters in the network is provided in Appendix A; and a monitoring instrument list, site-specific objectives and spatial scale, as well as measured parameters, sampling frequency, and methods are provided in Appendix B.

Table 2. Utah Air Monitoring Network Site Locations.

County	AQS code	Station Name	Station Address	Latitude	Longitude	Elevation (meters)
Cache	49-005-0007	Smithfield (SM)	675 West 220 North, Smithfield	41.84267	-111.852064	1379
Weber	49-057-1003	Harrisville (HV)	425 West 2550 North, Harrisville	41.302685	-111.986476	1320
Davis	49-011-0004	Bountiful (BV)	171 West 1370 North, Bountiful	40.902945	-111.884505	1309
	49-011-6001	Antelope Island (AI)	Great Salt Lake	41.039404	-112.231541	1355
Salt Lake	49-035-2005	Copperview (CV)	8449 South Monroe St., Midvale	40.597911	-111.894162	1343
	49-035-3015	Environmental Quality (EQ)	1950 West 240 North, Salt Lake City	40.777028	-111.94585	1284
	49-035-3006	Hawthorne (HW)	1675 South 600 East, Salt Lake City	40.734367	-111.872221	1308
	49-035-3013	Herriman #3 (H3)	14058 Mirabella Drive, Herriman	40.496412	-112.036329	1534
	49-035-3014	Lake Park (LP)	2782 South Corporate Park Dr., West Valley City	40.709905	-112.008684	1295
	49-035-4002	Near Road (NR)	5001 South Galleria Dr, Murray	40.662868	-111.901874	1305
	49-035-3010	Rose Park (RP)	1400 West Goodwin Ave., Salt Lake City	40.795514	-111.930996	1283
	49-035-3005	Saltair (SA)	6640 West 1680 North, Salt Lake City	40.805989	-112.049804	1289
	49-035-3016	Prison Site (ZZ)	1480 North 8000 West	40.80793	-112.087772	1287
Utah	49-049-4001	Lindon (LN)	50 North Main St., Lindon	40.339505	-111.713486	1444
	49-049-5010	Spanish Fork (SF)	2050 N. 300 W., Spanish Fork (airport)	40.136369	-111.658011	1380
Tooele	49-045-0004	Erda (ED)	2135 West Erda Way, Erda	40.600565	-112.355782	1321
	49-045-6001	Badger Island (BI)	Great Salt Lake	40.94212	-112.561943	1285
Duchesne	49-013-0002	Roosevelt (RS)	290 South 1000 West, Roosevelt	40.294175	-110.008961	1585
Uintah	49-047-1004	Vernal #4 (V4)	600 North 1650 West, Vernal	40.464812	-109.560731	1667

County	AQS code	Station Name	Station Address	Latitude	Longitude	Elevation (meters)
Carbon	49-007-1003	Price #2 (P2)	351 South 2500 East, Price	39.595749	-110.770097	1737
Garfield	49-017-0006	Escalante (ES)	Escalante National Monument	37.771861	-111.61541	1809
Iron	49-021-0005	Enoch (EN)	201 Thoroughbred Way, Enoch	37.747409	-113.055482	1693
Washington	49-053-0007	Hurricane (HC)	147 North 870 West, Hurricane	37.179138	-113.305105	992

Figure 1. Map of Utah showing the location of all monitoring sites in the DAQ monitoring Network.



Site_Code	Site_Name
AI	Antelope Island
BI	Badger Island
CV	Copperview
EN	Enoch
EQ	Environmental Quality
ED	Erda
ES	Escalante
HV	Harrisville
HW	Hawthorne
H3	Herriman #3
HC	Hurricane
LP	Lake Park
LN	Lindon
M7	Moab
NR	Near Road
P2	Price #2
ZZ	Prison Site
RS	Roosevelt #3
RP	Rose Park
SA	Saltair
SM	Smithfield
SF	Spanish Fork
V4	Vernal #4
BV	Viewmont (Bountiful)

Table 3. Measured parameters at the sampling stations in Utah air monitoring network.

County	Site	$PM_{2.5}$				PM_{10}			PM Coarse	Speciation $PM_{2.5}$	O_3	NO_X NO_2 NO	NO_y	SO_2	CO	NH_3	Toxics	Carbonyls	VOCs PAMS	BC	MET
		FRM	Co-located (FRM)	Real-time	Co-located (Real-time)	FRM	Co-located	Real-time													
Cache	Smithfield	1/1	1/1	X	X					1/6	X	X								X	X
Weber	Harrisville	1/1		X		1/1		X*			X	X			X						X
Davis	Bountiful	1/1		X						1/6	X	X					X	X		X	X
	Antelope Island																				X
Salt Lake	Copperview	1/1		X							X	X		X	X						X
	Environmental Quality	1/1		X		1/1		X*			X	X		X	X	X					X
	Hawthorne	1/1		X		1/1		X*	X	1/3	X	X	X	X	X			X	X		X
	Herriman #3			X	X	1/1		X*	X		X	X									X
	Lake Park			X							X	X								X	X
	Near Road	1/1		X							X	X			X						
	Rose Park	1/1	1/1	X							X	X		X	X						X
	Saltair																				X
	Prison (ZZ)			X							X	X								X	X
Tooele	Erda	1/1		X							X	X									X
	Badger Island																				X
Utah	Lindon	1/1	1/6	X		1/1		X*	X	1/6	X	X			X					X	X
	Spanish Fork	1/1		X							X	X									X
Uintah	Vernal	1/1		X							X	X									X
Duchesne	Roosevelt	1/1	1/1	X	X	1/1	1/6	X*	X		X	X									X
Carbon	Price #2			X							X	X									X
Iron	Enoch			X							X	X									X
Garfield	Escalante										X										
Washington	Hurricane			X							X	X									X

*Non-regulatory monitor; sites in *italic font* corresponds to remote stations; 1/1 are sampled daily; 1/6 are sampled every sixth day

Note: Co-located means an additional monitor(s) that can either be of the same type or of a different type. It can be an FRM and an FEM or a pair of FRM's or a pair of FEM's or in some cases it may also mean a third or fourth monitor at the same location.

1.2 Criteria Pollutants DAQ Network

1.2.1 Particulate Matter-Fine ($PM_{2.5}$)

DAQ currently operates 24-hour Federal Reference Method (FRM) and Federal Equivalent Method (FEM) $PM_{2.5}$ samplers throughout the state to demonstrate compliance with the National Ambient Air Quality Standards (NAAQS), evaluate population exposure, support SIP development and model performance evaluation as well as monitor PM levels in source and receptor areas. The DAQ currently uses 14 FRM $PM_{2.5}$ monitors and FEM continuous $PM_{2.5}$ samplers at 19 sampling sites distributed throughout the state. Some continuous monitors operate in co-location with FRM filter-based measurements for comparability assessment. Data obtained from the continuous monitors is used to support forecasting, mobile apps, web pages and reporting the Air Quality Index (AQI) information at the AIRNow website (www.airnow.gov).

1.2.2 Particulate Matter (PM_{10})

The DAQ currently operates seven 24-hour Federal Reference Method (FRM) PM_{10} samplers throughout the state to demonstrate compliance with NAAQS, evaluate population exposure, support PM maintenance plans and monitor PM levels in high-concentration areas.

The DAQ currently operates three FRM PM_{10} monitors in Salt Lake City CBSA, one FRM PM_{10} monitor within the Provo-Orem CBSA and one FRM monitor at the Duchesne CBSA.

1.2.3 Ozone (O_3)

The DAQ currently operates nine ozone monitors in the Salt Lake City CBSA; two ozone monitors within the Provo-Orem CBSA; two ozone monitors within the Ogden-Clearfield CBSA and one ozone monitor at Roosevelt, Price, Vernal, Logan, St. George and Cedar City CBSAs. Additionally, a Special Purpose Monitor (SPM) was installed at Escalante.

1.2.4 Sulfur Dioxide (SO_2)

The DAQ currently operates four SO_2 monitors within the Salt Lake City CBSA. The monitor at HW was designated as population-oriented and satisfies NCore requirements.

1.2.5 Nitrogen Dioxide (NO_2)

The DAQ currently operates NO_2 monitors in 19 out of the 23 monitoring stations that are presently operational. Although Utah has demonstrated compliance with NO_2 standards, DAQ maintains NO_2 monitoring at many sites since emissions of this pollutant can lead to increased O_3 levels and $PM_{2.5}$ formation, often resulting in pollution levels exceeding the NAAQS.

1.2.6 Carbon Monoxide (CO)

The DAQ currently operates a total of seven CO monitors in the Salt Lake City, Provo-Orem and Ogden-Clearfield CBSAs. The samplers are used to monitor population exposure to emissions from anthropogenic activities in the area as well as to support CO maintenance plans. EPA minimum requirements for CO monitoring also include CO monitors to be sited near roads in certain urban areas, including near-roadway NO_2 monitoring sites. Currently, a CO monitor is located on I-15 at the address 5001 South Galleria Dr, Murray, Near Road (NR) site to satisfy these requirements.

1.2.7 Lead (Pb)

Historically, major sources of lead emissions came from combustion of leaded fuel as on-road motor vehicle fuel emissions. However, given that leaded gasoline for automobiles was completely eliminated by the end of 1995 in the U.S., the only sources of lead in Utah include extraction and processing of metallic ores as well as piston-engine aircrafts.

On November 12, 2008, EPA revised the primary and secondary NAAQS for lead to 0.15 $\mu g/m^3$ in total suspended particles (TSP). The previous standards, which were issued by EPA in 1978, were 10 times higher (1.5 $\mu g/m^3$). To meet the standard, a rolling three-month average lead concentration may not exceed 0.15 $\mu g/m^3$. The State of Utah has been in compliance with the lead NAAQS since 1982, with EPA authorizing the discontinuation of lead monitoring in Utah in 2005. However, given that EPA established new requirements for lead monitoring in 2008 and 2010, DAQ resumed lead monitoring at Magna, a point source site near the Kennecott copper smelter, from 2010 through June 2017. EPA approved the discontinued monitoring in 2017 due to extremely low concentrations. DAQ and EPA will continue observing the requirements, such as source emission thresholds, population, and NAAQS revisions that may trigger the need to resume monitoring lead in Utah.

1.3 Chemical Speciation (CSN)

The DAQ currently operates four $PM_{2.5}$ chemical speciation sites, including Hawthorne (HW), Bountiful Viewmont (BV), Lindon (LN) and Smithfield (SM). HW site in Salt Lake County is an EPA-designated CSN monitoring station, operating on a 1-in-3-day sampling schedule. BV in Davis County, LN in Utah County and SM in Cache County are SLAMS $PM_{2.5}$ speciation sites, operating on a 1-in-6-day sampling schedule. Data from the speciation network is primarily used to determine $PM_{2.5}$ chemical composition and sources as well as the spatial and temporal variation in its components. There are over 50 species consisting of ions, elements, and carbon species reported by the CSN sites. A list of parameters measured in the CSN sites are provided in Table 4.

Table 4. List of parameters measured at the DAQ monitoring CSN sites.

Parameter (Method)	Compounds
$PM_{2.5}$ Speciation (Met One SASS/SuperSASS Nylon)	Ammonium Ion, Sodium Ion, Potassium Ion, Nitrate Ion, Sulfate Ion
$PM_{2.5}$ (Met One SASS/SuperSASS Teflon)	Antimony, Arsenic, Aluminum, Barium, Bromine, Cadmium, Calcium, Chromium, Cobalt, Copper, Chlorine, Cerium, Cesium, Iron, Lead, Indium, Manganese, Nickel, Magnesium, Phosphorus, Selenium, Tin, Titanium, Vanadium, Silicon, Silver, Zinc, Strontium, Sulfur, Rubidium, Potassium, Sodium, Zirconium
$PM_{2.5}$ (URG 3000N w/Pall Quartz filter and Cyclone Inlet)	Elemental carbon (*E1 CSN, E2 CSN, E3 CSN, EC CSN TOR, EC CSN TOT*). Organic carbon (*OC1 CSN, OC2 CSN, OC3 CSN, OC4 CSN, OC CSN TOR, OC CSN TOT, OP CSN TOR*), OP CSN TOT, TC CSN

1.4 Multipollutant Monitoring Network (NCore)

The DAQ currently operates one multi-pollutant network NCore site, Hawthorne, located in Salt Lake County. This site is equipped with several advanced measurement systems to monitor PM ($PM_{2.5}$ and PM_{10}), ozone, NO_2, true-NO_2, trace levels of CO, SO_2, total reactive nitrogen (NO_y), Carbonyl Compounds, organic and elemental carbon as well as meteorological parameters including the Mixing Layer Height. This site satisfies federal requirements for the Photochemical Assessment Monitoring Station (PAMS) network program.

1.5 Photochemical Assessment Monitoring System (PAMS)

The DAQ currently operates one PAMS site at Hawthorne, located in Salt Lake County. The PAMS program is designed with the objective to produce an air quality database to be used to evaluate and refine ozone prediction models. In addition, the program will assist to identify and quantify the ozone precursors, establish the temporal patterns and associated meteorological conditions to assist and refine the control strategies. DAQ is measuring the following parameters at the PAMS required site:

- Carbonyls
- Meteorological parameters: ambient temperature, wind direction, wind speed, atmospheric pressure, relative humidity, precipitation, mixing layer height, solar radiation, and UV radiation
- Speciated VOCs
- True NO_2
- NO/NO_y
- Ozone

The DAQ-PAMS site collects hourly speciated VOC measurements with a Markes/Agilent autoGC (Figure 2) which operates on a year-round basis. Carbonyl species are collected in a three 8-hour averaged samples per day on a 1-in-3-day schedule from June 1 to August 31 and 1 in 24-hr on a 1-in-3-day for the remaining part of the year. The list of the speciated VOCs and carbonyls measured at the site are listed in Table 5.

Figure 2. Markes/Agilent autoGC

Table 5. List of PAMS VOCs and Carbonyls measured at the DAQ PAMS site.

Parameter	Compounds
VOCs	Total NMOC (non-methane organic compound), n-Dodecane, Ethane, Ethylene, Propane, Propylene, Acetylene, n-Butane, Isobutane, trans-2-Butene,cis-2-Butene, 1,3-Butadiene, n-Pentane, Isopentane, 1-Pentene, trans-2-Pentene, cis-2-Pentene, 3-Methylpentane, n-Hexane, n-Heptane, n-Octane, n-Nonane, n-Decane, Cyclopentane, Isoprene, 2,2-Dimethylbutane, 1-Hexene, 2-Methyl-1-pentene, 2,4-Dimethylpentane, Cyclohexane, 3-Methylhexane, 2,2,4-Trimethylpentane, 2,3,4-Trimethylpentane, 3-Methylheptane, alpha-Pinene, beta-Pinene, Methylcyclohexane, Methylcyclopentane, 2-Methylhexane, 1-Butene, 2,3-Dimethylbutane, 2-Methylpentane, 2,3-Dimethylpentane, n-Undecane, 2-Methylheptane, 2-Methylheptane, m/p Xylene, Benzene, Toluene, Ethylbenzene, o-Xylene, 1,3,5-Trimethylbenzene, 1,2,4-Trimethylbenzene, n-Propylbenzene, Isopropylbenzene, o-Ethyltoluene, m-Ethyltoluene, p-Ethyltoluene, m-Diethylbenzene, p-Diethylbenzene, Styrene, 1,2,3-Trimethylbenzene
Carbonyls	Formaldehyde, Acetaldehyde, Propionaldehyde, Butyraldehyde, Hexanaldehyde, Valeraldehyde, Crotonaldehyde, Acetone, Methyl ethyl ketone, Benzaldehyde

1.6 Air Toxics Trends

The DAQ has been participating in the EPA-funded Urban Air Toxics Monitoring Program since 1999. In January 2003, the air toxics monitoring equipment was re-located from West Valley to Bountiful Viewmont (BV) in order to co-locate the air toxics monitors with $PM_{2.5}$ speciation samplers, which would provide a more complete characterization of monitored air pollutants.

Currently, more than 50 VOCs, 10 carbonyls, 19 PAHs and 11 metals are measured as part of the air toxics trends program. The samples are collected on a 1-in-6-day sampling schedule over a 24-hour period. The list of the air toxics measured at the site are listed in Table 6

Table 6. List of toxics measured at the DAQ NATTS site.

Parameter	Compounds
VOCs	Carbon disulfide, Propylene, Acetylene, Freon 114, 1,3-Butadiene, n-Octane, Methyl tert-butyl ether, Tert-amyl methyl ether, tert-Butyl ethyl ether, Ethyl acrylate, Methyl methacrylate, Acrolein, Methyl isobutyl ketone, Ethylene oxide, Acetonitrile, Acrylonitrile, Chloromethane, Dichloromethane, Chloroform, Carbon tetrachloride, Bromoform, Trichlorofluoromethane, Chloroethane, 1,1-Dichloroethane, Methyl chloroform, Ethylene dichloride, Tetrachloroethylene, Tetrachloroethylene, 1,1,2,2-Tetrachloroethane, Bromomethane, 1,1,2-Trichloroethane, 1,1,2-Trichloro-1,2,2-trifluoroethane, Dichlorodifluoromethane, Trichloroethylene, 1,1-Dichloroethylene, Bromodichloromethane, 1,2-Dichloropropane, trans-1,3-Dichloropropene, trans-1,3-Dichloropropene, cis-1,3-Dichloropropene, Dibromochloromethane, Chloroprene, Bromochloromethane, trans-1,2-Dichloroethylene, cis-1,2-Dichloroethene, Ethylene dibromide, Hexachlorobutadiene, Vinyl chloride, m/p Xylene, Benzene, Toluene, Ethylbenzene, o-Xylene, 1,3,5-Trimethylbenzene, 1,2,4-Trimethylbenzene, Styrene, Chlorobenzene, 1,2-Dichlorobenzene, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, 1,2,4-Trichlorobenzene.
Carbonyls	Formaldehyde, Acetaldehyde, Propionaldehyde, Butyraldehyde, Hexanaldehyde, Valeraldehyde, Crotonaldehyde, Acetone, Methyl ethyl ketone, Benzaldehyde
PAHs	Naphthalene, Acenaphthene, Acenaphthylene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Chrysene, Coronene, Perylene, Benzo[a]anthracene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Benzo[e]pyrene, Dibenzo[a,h]anthracene, Benzo[g,h,i]perylene, Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene
Metals (PM_{10})	Antimony, Arsenic, Beryllium, Cadmium, Chromium, Cobalt, Lead, Manganese, Nickel, Mercury, Selenium

1.7 Mercury Deposition Network

Mercury was of significant health and environmental concern in Utah. Advisories limiting the consumption of fish were issued for certain lakes and watersheds due to their elevated mercury levels in 2008. DAQ was part of the National Mercury Deposition Network, measuring mercury dry deposition from 2009 to summer 2017, and measurements were discontinued after consultation with the EPA.

1.8 Meteorological Monitoring Network

Meteorological parameters, including ambient temperature, temperature differential, relative humidity, ambient pressure, solar radiation as well as wind speed and direction are currently measured at multiple sites throughout the state of Utah in order to properly represent the complex wind patterns and micrometeorology in Utah's airshed and to support air quality models and trends in co-located air pollutants. In 2021, DAQ updated the technology used to measure the meteorological variables. Previously, the system used to measure the wind direction and speed consisted of cup anemometers and vane systems (in all the stations but Roosevelt), but, it was replaced by sonic anemometer systems (2D sonic sensors, RM Young Ultrasonic 86004). The modifications will reduce the time spent maintaining the meteorological systems and a lower the detection threshold, which will allow DAQ to capture and better understand the small eddies and transports during our cold pool seasons, where the typical analog sensor will read no wind flow. The new system is smaller and more cost effective than the previous set up, which is favorable for the limited space in the monitoring shelters.

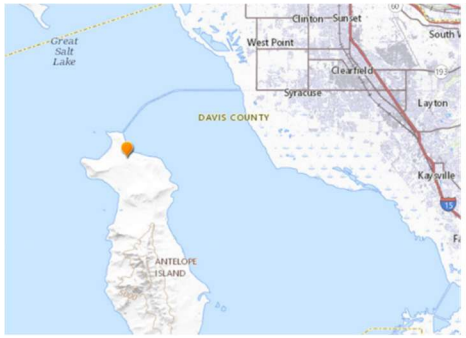
A second crucial update was to get a combination of temperature and relative humidity sensors (Campbell Scientific HMP60) at every site, which is beneficial for air quality modeling application. In addition, pyranometers (Campbell Scientific CS301) to measure incoming solar radiation were also installed.

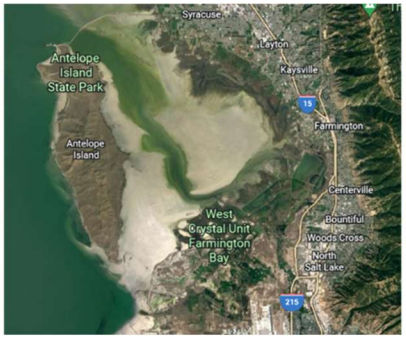
Appendix A- List of equipment used at the DAQ monitoring sites

Parameter	Units	Mfg	Model #	Details
$PM_{2.5}$ FRM	Micrograms/cubic meter (25 C)	R & P	2025i	Low volume sampler (filter) with very sharp cut cyclone (VSCC) - Gravimetric
$PM_{2.5}$ FEM	Micrograms/cubic meter (25 C)	Thermo	5030i Sharp	Beta Attenuation
	Micrograms/cubic meter (25 C)	Teledyne API	T640/T640X	Broadband Spectroscopy
PM_{10} FRM	Micrograms/cubic meter (25 C)	R & P	2025i	Low volume sampler (filter) - Gravimetric
PM_{10} FEM	Micrograms/cubic meter (25 C)	MetOne	E-BAM PLUS	Beta Attenuation Mass Monitor
$PM_{2.5}$ Speciation	Micrograms/cubic meter (LC)	Met One SASS	Met One SASS/SuperSASS	Met One SASS/SuperSASS: Teflon/Energy dispersive XRF; Nylon/Ion Chromatography
	Micrograms/cubic meter (LC)	URG	3000N	URG 3000N w/Pall Quartz Filter-Organic/Inorganic Carbon
Carbon Monoxide	Parts per million	Teledyne API	T300U	Gas Filter Correlation
Carbon Monoxide (trace level)	Parts per million	Teledyne API	T300	Gas Filter Correlation
Nitrogen Dioxide (trace)	Parts per billion	Teledyne API	T200U	Gas Phase Chemiluminescence
Nitrogen Dioxide (true)	Parts per billion	Teledyne API	T200UP	Photolytic-Chemiluminescence
Reactive Oxides of Nitrogen (NO_Y)	Parts per billion	Teledyne API	T200U	Chemiluminescence Thermo Electron 42C-Y, 42i-Y
Sulfur Dioxide	Parts per billion	Teledyne API	T100	Pulsed Fluorescent 43C-TLE/43i-TLE
Sulfur Dioxide (trace)	Parts per billion	Teledyne API	T100U	Pulsed Fluorescent 43C-TLE/43i-TLE
Ozone	Parts per million	Teledyne API	T400	Ultraviolet Absorption
Black Carbon	Micrograms/cubic meter (LC)	Magee	AE33	Aethalometer - Optical Absorption
Air Toxics (carbonyls)	Parts per billion Carbon	ATEC	8000	SILICA-DNPH-CARTRIDGE-KI O3 SCRUB - HPLC
Air Toxics (VOCs)	Parts per billion Carbon	ATEC	2200	6L SUBATM SS CANISTER or SS-CANISTER-PRESSURIZED
Air Toxics (PM_{10} Metals)	Nanograms/cubic meter (25 C)	TISCH	TE-Wilbur10	Tisch Model TE-Wilbur10 Low-Volume Sampler
Air Toxics (PAHs)	Nanograms/cubic meter (25 C)	TISCH	TE-Wilbur-BL	High Volume Sampler (PUF) GC/MS TO-13
Air Toxics (hourly VOCs)	Parts per billion Carbon	Agilent/Markes CIA	T890B	Preconcentrator trap/thermal desorber - electronic drier - Markes CIA TD/Agilent GC dual FID - carbon response

Parameter	Units	Mfg	Model #	Details
Mixing Height	Meters	Vaisala	CL-51	Optical Scattering Ceilometer
Wind Direction/Speed	Degrees Compass/Knots	RM Young	Ultrasonic Anemometer-86004	Sonic Anemometer
Relative Humidity	Percent relative humidity			Electronic RH Sensor
Solar Radiation	Langleys/minute			Electronic Sensors
Ambient Temperature	Degrees Fahrenheit			Electronic Temperature Sensor
Barometric Pressure	Millibars			Electronic Sensors

Appendix B- Site Information





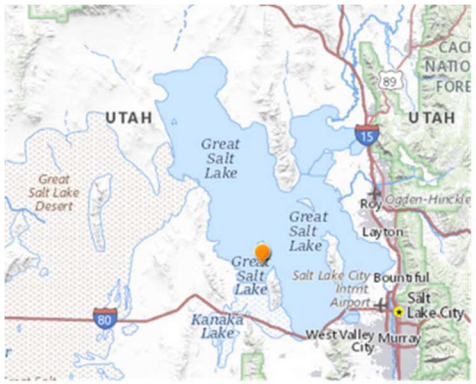
Site:	Antelope Island (AI)	Longitude:	-112.231541	Station Type:	SPM
AQS#:	49-011-6001	**Latitude:**	41.039404	**MSA:**	Ogden-Clearfield
Address:	Antelope Island	**Elevation (m):**	1355		
City:	N/A				
County:	Davis				

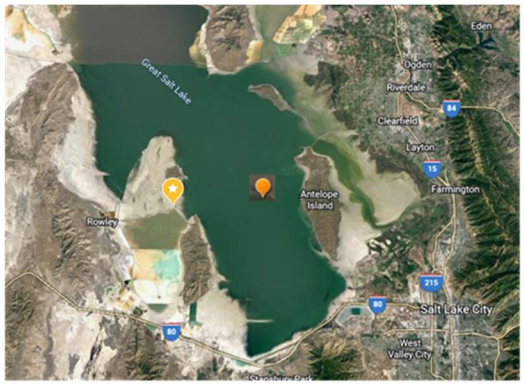
Site Objective:
This site is established to collect meteorological information for air quality modeling inputs.
Does the site meet the objective? Yes, all objectives are met.

Site Description:
The site is on Antelope Island State Park, near the ranger residences, in Davis County.
Can data from this site be used to evaluate NAAQS? No

Meteorological Parameters

Parameter	Sampling & Analysis Method	Operating Schedule	Tower Height	Spatial Scale
Relative Humidity	Elec. Thin Film	Continuous	6 meters	Urban
Ambient Temperature	Elec. Resistance	Continuous	6 meters	Urban
Wind Direction	Elec. Resistance Level 1	Continuous	6 meters	Urban
WD Sigma	Elec. EPA Method	Continuous	6 meters	Urban
Wind Speed	Elec. Chopped Signal Level 1	Continuous	6 meters	Urban





Site:	Badger Island (BI)	Longitude:	-112.231541	Station Type:	SPM
AQS#:	49-011-6001	**Latitude:**	40.94212	**MSA:**	Salt Lake City
Address:	No street address, on an Island	**Elevation (m):**	1285		
City:	N/A				
County:	Davis				

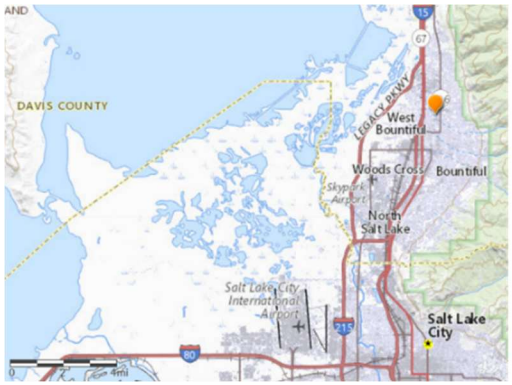
Site Objective:
This site is established to collect meteorological information for air quality modeling inputs.
Does the site meet the objective? Yes, all objectives are met.

Site Description: The site is on Badger Island

Can data from this site be used to evaluate NAAQS? No

Meteorological Parameters

Parameter	Sampling & Analysis Method	Operating Schedule	Tower Height	Spatial Scale
Relative Humidity	Elec. Thin Film	Continuous	6 meters	Urban
Ambient Temperature	Elec. Resistance	Continuous	6 meters	Urban
Wind Direction	Elec. Resistance Level 1	Continuous	6 meters	Urban
WD Sigma	Elec. EPA Method	Continuous	6 meters	Urban
Wind Speed	Elec. Chopped Signal Level 1	Continuous	6 meters	Urban



Site:	Bountiful Viewmont (BV)	Longitude:	-111.884505	Station Type:	SLAMS
AQS#:	49-011-0004	**Latitude:**	40.902945	**MSA:**	Ogden-Clearfield
Address:	1370 North 171 West	**Elevation (m):**	1309		
City:	Bountiful				
County:	Davis				

Site Objective:
The Bountiful Viewmont site is established to determine public exposure to air pollution. The site also monitors emissions from nearby oil refineries and local sand and gravel operations. Previous monitoring and saturation studies have recorded high ozone concentrations. This site is chosen for intensive speciation of $PM_{2.5}$ under the EPA Chemical Speciation Network (CSN) and gaseous Volatile Organic Compounds under the EPA National Air Toxics Trends Network (NTTN) including hexavalent chromium and carbonyl compounds. Nitrogen dioxide is monitored in support of the ozone monitoring.

Does the site meet the objective? Yes, all objectives are met.

Site Description:
The site is located near Viewmont High School at the north end of the city of Bountiful, Davis County.
Can data from this site be used to evaluate NAAQS? Yes

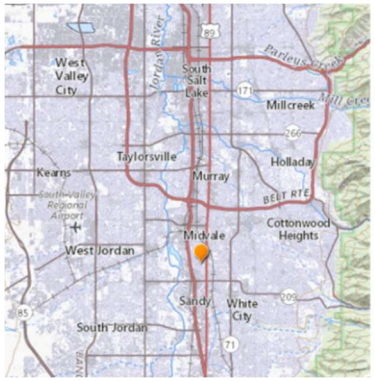
Gaseous/Particulate Parameters

Parameter	Sampling & Analysis Method	Operating Schedule	Monitoring Objective	Spatial Scale
Nitrogen Dioxide	Gas Phase Chemiluminescence	Continuous	Population Exposure	SLAMS- Population Neighborhood
Ozone	Ultraviolet	Continuous	Population Exposure	SLAMS-High Neighborhood
$PM_{2.5}$	Manual Gravimetric	Daily	Population Exposure	SLAMS- Population Neighborhood

$PM_{2.5}$ Real Time	Synchronized Hybrid Ambient Real Time Particulate Monitor	Continuous	Air Quality Index	SLAMS- Population Neighborhood
PM_{10} Metals	Manual Gravimetric	1 in 6 days	Population Exposure	SLAMS- Population Neighborhood
PM_{10} Metals Co-located	Manual Gravimetric	6 samples/year	Population Exposure	SLAMS- Population Neighborhood
$PM_{2.5}$ Speciation	Manual EPA CSN	1 in 6 days	Population Exposure	SLAMS- Population Neighborhood
VOC	Manual EPA NATTS	1 in 6 days	Population Exposure	SLAMS- Population Neighborhood
Semi-volatile	Manual EPA NATTS	1 in 6 days	Population Exposure	SLAMS- Population Neighborhood
Carbonyl compounds	Manual EPA NATTS	1 in 6 days	Population Exposure	SLAMS- Population Neighborhood
Black Carbon	Aethalometer	Continuous	Population Exposure	SLAMS- Population Neighborhood

Meteorological Parameters

Parameter	Sampling & Analysis Method	Operating Schedule	Tower Height	Spatial Scale
Relative Humidity	Air Temperature and Relative Humidity Sensor- Electronic Thin Film	Continuous	10 meters	Urban
Ambient Temperature	Air Temperature and Relative Humidity Sensor- Electronic Resistance	Continuous	10 meters	Urban
Wind Direction	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Wind Speed	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Ambient Pressure	Barometric Pressure Transducer	Continuous	10 meters	Urban
WD Sigma	Electronic EPA Method	Continuous	10 meters	Urban
Solar Radiation	Solar Radiation sensor	Continuous	10 meters	Urban




Site:	Copperview (CV)	Longitude:	-111.894162	Station Type:	SLAMS
AQS#:	49-035-2005	**Latitude:**	40.597911	**MSA:**	Salt Lake City
Address:	8449 South Monroe St.	**Elevation (m):**	1343		
City:	Midvale				
County:	Salt Lake				

Site Objective:
Site established to assess population exposure in southeast Salt Lake County

Does the site meet the objective? Yes, all objectives are met.

Site Description:
The site is located in a neighborhood area of Midvale in Salt Lake County.
Can data from this site be used to evaluate NAAQS? Yes

Gaseous/Particulate Parameters

Parameter	Sampling & Analysis Method	Operating Schedule	Monitoring Objective	Spatial Scale
Nitrogen Dioxide	Gas Phase Chemiluminescence	Continuous	Population Exposure	SLAMS- Population Neighborhood
Ozone	Ultraviolet	Continuous	Population Exposure	SLAMS-High Neighborhood
Carbon Monoxide, Trace	Gas Phase Correlation	Continuous	Population Exposure	SLAMS- Population Neighborhood
Sulfur Dioxide, Trace	Pulsed Fluorescence	Continuous	Population Exposure	SLAMS- Population Neighborhood
$PM_{2.5}$	Manual Gravimetric	Daily	Population Exposure	SLAMS- Population Neighborhood

$PM_{2.5}$ Real Time	Synchronized Hybrid Ambient Real Time Particulate Monitor	Continuous	Air Quality Index	SLAMS- Population Neighborhood

Meteorological Parameters				
Parameter	**Sampling & Analysis Method**	**Operating Schedule**	**Tower Height**	**Spatial Scale**
Relative Humidity	Air Temperature and Relative Humidity Sensor- Electronic Thin Film	Continuous	10 meters	Urban
Ambient Temperature	Air Temperature and Relative Humidity Sensor- Electronic Resistance	Continuous	10 meters	Urban
Wind Direction	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Wind Speed	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Ambient Pressure	Barometric Pressure Transducer	Continuous	10 meters	Urban
WD Sigma	Electronic EPA Method	Continuous	10 meters	Urban
Solar Radiation	Solar Radiation sensor	Continuous	10 meters	Urban

Site:	Enoch (EN)	Longitude:	-113.055482	Station Type:	SLAMS
AQS#:	49-021-0005	**Latitude:**	37.747409	**MSA:**	Not in MSA
Address:	3840 North 325 East	**Elevation (m):**	1693		
City:	Enoch				
County:	Iron				

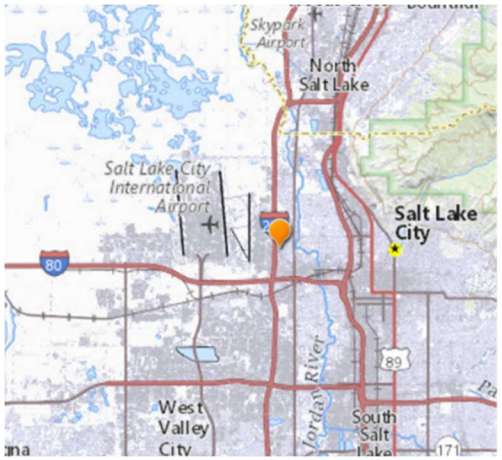
Site Objective:
Site established to contain SPM equipment to assess population exposure in Iron County prior to full-scale monitoring
Does the site meet the objective? Yes, all objectives are met.

Site Description:
This site is located in a county area near Enoch.
Can data from this site be used to evaluate NAAQS? Yes

Gaseous/Particulate Parameters

Parameter	Sampling & Analysis Method	Operating Schedule	Monitoring Objective	Spatial Scale
Nitrogen Dioxide	Gas Phase Chemiluminescence	Continuous	Population Exposure	SLAMS- Population Neighborhood
Ozone	Ultraviolet	Continuous	Population Exposure	SLAMS-High Neighborhood

$PM_{2.5}$ Real Time	Synchronized Hybrid Ambient Real Time Particulate Monitor	Continuous	Air Quality Index	SLAMS- Population Neighborhood
Meteorological Parameters				
Parameter	**Sampling & Analysis Method**	**Operating Schedule**	**Tower Height**	**Spatial Scale**
Relative Humidity	Air Temperature and Relative Humidity Sensor- Electronic Thin Film	Continuous	10 meters	Urban
Ambient Temperature	Air Temperature and Relative Humidity Sensor- Electronic Resistance	Continuous	10 meters	Urban
Wind Direction	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Wind Speed	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Ambient Pressure	Barometric Pressure Transducer	Continuous	10 meters	Urban
WD Sigma	Electronic EPA Method	Continuous	10 meters	Urban
Solar Radiation	Solar Radiation sensor	Continuous	10 meters	Urban




Site:	Environmental Quality (EQ)	Longitude:	-111.94585	Station Type:	SLAMS
AQS#:	49-035-3015	**Latitude:**	40.777028	**MSA:**	Salt Lake City
Address:	1950 West 240 North	**Elevation (m):**	1284		
City:	Salt Lake City				
County:	Salt Lake				

Site Objective:
The Air Monitoring Center site is established to replace the Rose Park station as an area of further investigation of $PM_{2.5}$ in Salt Lake County.
Does the site meet the objective? Yes, all objectives are met.

Site Description:
The site is located at the Technical Monitoring Center in the city of Salt Lake, Salt Lake County**.**
Can data from this site be used to evaluate NAAQS? Yes

Gaseous/Particulate Parameters

Parameter	Sampling & Analysis Method	Operating Schedule	Monitoring Objective	Spatial Scale
Ammonia	Manual NADP AMoN	Integrated 14 days	Population Exposure	SPM-Transport Regional
Trace Nitrogen Dioxide	Gas Phase Chemiluminescence	Continuous	Population Exposure	SLAMS- High Neighborhood

Ozone	Ultraviolet	Continuous	Population Exposure	SLAMS- High Neighborhood
Carbon Monoxide	Gas Phase Correlation	Continuous	Population Exposure	SLAMS- High Neighborhood
Sulfur Dioxide, Trace	Pulsed Fluorescence	Continuous	Population Exposure	SLAMS- High Neighborhood
$PM_{2.5}$	Manual Gravimetric	Daily	Population Exposure	SLAMS- High Neighborhood
$PM_{2.5}$ Real Time	Synchronized Hybrid Ambient Real Time Particulate Monitor	Continuous	Air Quality Index	SLAMS- Population Neighborhood
PM_{10}	Manual Gravimetric	Daily	Population Exposure	SLAMS-Population Neighborhood
PM_{10}	Beta Attenuation Mass Monitor	Continuous	Air Quality Index	SLAMS-Population Neighborhood

Meteorological Parameters

Parameter	**Sampling & Analysis Method**	**Operating Schedule**	**Tower Height**	**Spatial Scale**
Relative Humidity	Air Temperature and Relative Humidity Sensor- Electronic Thin Film	Continuous	10 meters	Urban
Ambient Temperature	Air Temperature and Relative Humidity Sensor- Electronic Resistance	Continuous	10 meters	Urban
Wind Direction	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Wind Speed	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Ambient Pressure	Barometric Pressure Transducer	Continuous	10 meters	Urban
WD Sigma	Electronic EPA Method	Continuous	10 meters	Urban
Solar Radiation	Solar Radiation sensor	Continuous	10 meters	Urban

Site:	Erda (ED)	Longitude:	-112.355782	Station Type:	SLAMS
AQS#:	49-045-0004	**Latitude:**	40.600565	**MSA:**	Salt Lake City
Address:	2163 West Erda Way	**Elevation (m):**	1321		
City	Erda				
County:	Tooele				

Site Objective:
This site is established to determine population exposure to air pollutants.

Does the site meet the objective? Yes, all objectives are met.

Site Description:
The site is located in the city of Erda, Tooele County. It is the main monitor for the Tooele county.

Can data from this site be used to evaluate NAAQS? Yes

Gaseous/Particulate Parameters

Parameter	Sampling & Analysis Method	Operating Schedule	Monitoring Objective	Spatial Scale
Nitrogen Dioxide	Gas Phase Chemiluminescence	Continuous	Population Exposure	SLAMS- Population Neighborhood
Ozone	Ultraviolet	Continuous	Population Exposure	SLAMS-High Neighborhood
$PM_{2.5}$	Manual Gravimetric	Daily	Population Exposure	SLAMS- Population Neighborhood
$PM_{2.5}$ Real Time	Synchronized Hybrid Ambient Real Time Particulate Monitor	Continuous	Air Quality Index	SLAMS- Population Neighborhood

Meteorological Parameters				
Parameter	**Sampling & Analysis Method**	**Operating Schedule**	**Tower Height**	**Spatial Scale**
Relative Humidity	Air Temperature and Relative Humidity Sensor- Electronic Thin Film	Continuous	3 meters	Urban
Ambient Temperature	Air Temperature and Relative Humidity Sensor- Electronic Resistance	Continuous	10 meters	Urban
Wind Direction	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Wind Speed	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Ambient Pressure	Barometric Pressure Transducer	Continuous	10 meters	Urban
WD Sigma	Electronic EPA Method	Continuous	10 meters	Urban
Solar Radiation	Solar Radiation sensor	Continuous	10 meters	Urban


Site:	Escalante (ES)	Longitude:	-111.61541	Station Type:	SPM
AQS#:	49-017-0006	**Latitude:**	37.771861	**MSA:**	NA
Address:	Escalante National Monument	**Elevation (m):**	1809		
City	Escalante				
County:	Garfield				

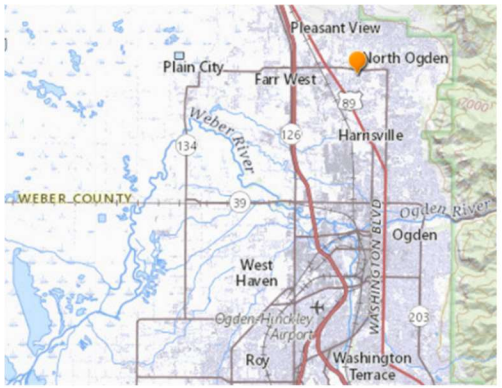
Site Objective:
This site is established to measure ozone near Escalante National Monument

Does the site meet the objective? Yes, all objectives are met.

Site Description:
The site is located at the Escalante National Monument visitor's center in Escalante, Garfield County. This site is funded by the Bureau of Land Management
Can data from this site be used to evaluate NAAQS? Yes

Gaseous/Particulate Parameters

Parameter	Sampling & Analysis Method	Operating Schedule	Monitoring Objective	Spatial Scale
Ozone	Ultraviolet	Continuous	Population Exposure	Regional




Site:	Harrisville (HV)	Longitude:	-111.986476	Station Type:	SLAMS
AQS#:	49-057-1003	**Latitude:**	41.302685	**MSA:**	Ogden-Clearfield
Address:	425 West 2550 North	**Elevation (m):**	1320		
City:	Harrisville				
County:	Weber				

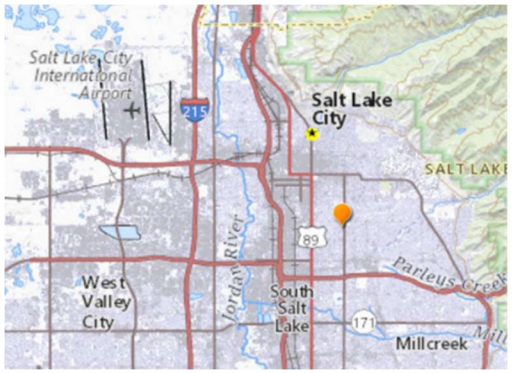
Site Objective:
This site is established in response to an ozone saturation study indicating this as a potentially high ozone concentration area. It is monitoring Particulate matter
Does the site meet the objective? Yes, all objectives are met.

Site Description:
The site is located on the grounds of Majestic Elementary School in the city of Harrisville, Weber County.
Can data from this site be used to evaluate NAAQS? Yes

Gaseous/Particulate Parameters

Parameter	Sampling & Analysis Method	Operating Schedule	Monitoring Objective	Spatial Scale
Nitrogen Dioxide	Gas Phase Chemiluminescence	Continuous	Population Exposure	SLAMS- Population Neighborhood
Ozone	Ultraviolet	Continuous	Population Exposure	SLAMS-High Neighborhood
Carbon Monoxide	Gas Phase Correlation	Continuous	Population Exposure	SLAMS-High Neighborhood
$PM_{2.5}$	Manual Gravimetric	Daily	Population Exposure	SLAMS- Population Neighborhood

$PM_{2.5}$ Real Time	Synchronized Hybrid Ambient Real Time Particulate Monitor	Continuous	Air Quality Index	SLAMS- Population Neighborhood
PM_{10}	Manual Gravimetric	Daily	Population Exposure	SLAMS- Population Neighborhood
PM_{10} Real Time	Beta Attenuation Mass Monitor	Continuous	Air Quality Index	SLAMS- Population Neighborhood
Meteorological Parameters				
Parameter	**Sampling & Analysis Method**	**Operating Schedule**	**Tower Height**	**Spatial Scale**
Relative Humidity	Air Temperature and Relative Humidity Sensor- Electronic Thin Film	Continuous	10 meters	Urban
Ambient Temperature	Air Temperature and Relative Humidity Sensor- Electronic Resistance	Continuous	10 meters	Urban
Wind Direction	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Wind Speed	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Ambient Pressure	Barometric Pressure Transducer	Continuous	10 meters	Urban
WD Sigma	Electronic EPA Method	Continuous	10 meters	Urban
Solar Radiation	Solar Radiation sensor	Continuous	10 meters	Urban




Site:	Hawthorne (HW)	Longitude:	-111.872221	Station Type:	SLAMS
AQS#:	49-035-3006	**Latitude:**	40.734367	**MSA:**	Salt Lake City
Address:	1675 South 600 East	**Elevation (m):**	1308		
City:	Salt Lake City				
County:	Salt Lake				

Site Objective:
This site is established to represent population exposure in the Salt Lake City area. This site is also designated as the EPA NCORE site for Utah.
Does the site meet the objective? Yes, all objectives are met.

Site Description:
The site is located at Hawthorne Elementary School in the southeast section of Salt Lake City, Salt Lake County.
Can data from this site be used to evaluate NAAQS? Yes

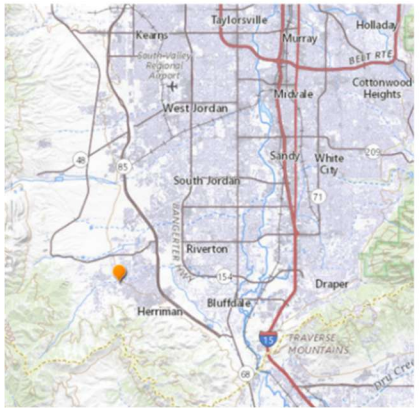
Gaseous/Particulate Parameters

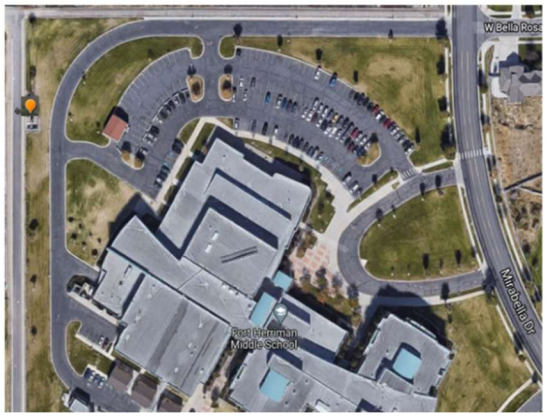
Parameter	Sampling & Analysis Method	Operating Schedule	Monitoring Objective	Spatial Scale
Nitrogen Dioxide	Gas Phase Chemiluminescence	Continuous	Population Exposure	SLAMS- Population Neighborhood
Nitrogen Dioxide (true)	Photolytic-Chemiluminescence	Continuous	Population Exposure	SLAMS- Population Neighborhood
Ozone	Ultraviolet	Continuous	Population Exposure	SLAMS-High Neighborhood
Carbon Monoxide Trace	Gas Phase Correlation	Continuous	Population Exposure	SLAMS-High Neighborhood
NOy Trace Level	Gas Phase Chemiluminescence	Continuous	Population Exposure	SLAMS- Population Neighborhood

SO2 Trace Level	Pulsed Fluorescence	Continuous	Population Exposure	SLAMS- Population Neighborhood
$PM_{2.5}$	Manual Gravimetric	Daily	Population Exposure	SLAMS- Population Neighborhood
$PM_{2.5}$ Speciation	Manual EPA CSN	1 in 3 days	Population Exposure	SLAMS- Population Neighborhood
$PM_{2.5}$ Real Time	Synchronized Hybrid Ambient Real Time Particulate Monitor	Continuous	Air Quality Index	SLAMS- Population Neighborhood
PM_{10}	Manual Gravimetric	Daily	Population Exposure	SLAMS- Population Neighborhood
PM_{10} Real Time	Beta Attenuation Mass Monitor	Continuous	Air Quality Index	SLAMS- Population Neighborhood
PM_{coarse}	Manual Gravimetric Subtraction	Daily	Population Exposure	SLAMS- Population Neighborhood
Air Toxics (hourly VOCs-PAMS)	Instrumental Gas Chromatography	Continuous	Ozone modeling input	Population Neighborhood

Meteorological Parameters

Parameter	**Sampling & Analysis Method**	**Operating Schedule**	**Tower Height**	**Spatial Scale**
Relative Humidity	Air Temperature and Relative Humidity Sensor- Electronic Thin Film	Continuous	10 meters	Urban
Ambient Temperature	Air Temperature and Relative Humidity Sensor- Electronic Resistance	Continuous	10 meters	Urban
Wind Direction	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Wind Speed	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Ambient Pressure	Barometric Pressure Transducer	Continuous	3 meters	Urban
WD Sigma	Electronic EPA Method	Continuous	10 meters	Urban
Relative Humidity	Air Temperature and Relative Humidity	Continuous	10 meters	Urban
Solar Radiation	Solar Radiation sensor	Continuous	4 meters	Urban
Mixing Height	Optical Scattering Ceilometer	Continuous	10 meters	Urban





Site:	Herriman #3 (H3)	Longitude:	-112.036329	Station Type:	SLAMS
AQS#:	49-035-3012	**Latitude:**	40.496412	**MSA:**	Salt Lake City
Address:	14058 Mirabella Drive	**Elevation (m):**	1534		
City:	Herriman				
County:	Salt Lake				

Site Objective:
This site is established to represent population exposure in southwest the Salt Lake County.
Does the site meet the objective? Yes, all objectives are met.

Site Description:
The site is located at Fort Herriman Middle School in southwest Salt Lake County
Can data from this site be used to evaluate NAAQS? Yes

Gaseous/Particulate Parameters

Parameter	Sampling & Analysis Method	Operating Schedule	Monitoring Objective	Spatial Scale
Nitrogen Dioxide	Gas Phase Chemiluminescence	Continuous	Population Exposure	SLAMS- Population Neighborhood
Ozone	Ultraviolet	Continuous	Population Exposure	SLAMS-High Neighborhood
$PM_{2.5}$ Real Time	Synchronized Hybrid Ambient Real Time Particulate Monitor	Continuous	Air Quality Index	SLAMS- Population Neighborhood

$PM_{2.5}$ Real Time	Synchronized Hybrid Ambient Real Time Particulate Monitor Co-located	Continuous	Precision and Accuracy	SLAMS- Population Neighborhood
PM_{10}	Manual Gravimetric	Daily	Population Exposure	SLAMS- Population Neighborhood
PM_{10} Real Time	Beta Attenuation Mass Monitor	Continuous	Air Quality Index	SLAMS- Population Neighborhood
Meteorological Parameters				
Parameter	**Sampling & Analysis Method**	**Operating Schedule**	**Tower Height**	**Spatial Scale**
Relative Humidity	Air Temperature and Relative Humidity Sensor- Electronic Thin Film	Continuous	10 meters	Urban
Ambient Temperature	Air Temperature and Relative Humidity Sensor- Electronic Resistance	Continuous	10 meters	Urban
Wind Direction	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Wind Speed	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Ambient Pressure	Barometric Pressure Transducer	Continuous	10 meters	Urban
WD Sigma	Electronic EPA Method	Continuous	10 meters	Urban
Solar Radiation	Solar Radiation sensor	Continuous	10 meters	Urban

Site:	Hurricane (HC)	Longitude:	-113.305105	Station Type:	SLAMS
AQS#:	49-053-0007	**Latitude:**	37.179138	**MSA:**	St George
Address:	147 North 870 West	**Elevation (m):**	992		
City:	Hurricane				
County:	Washington				

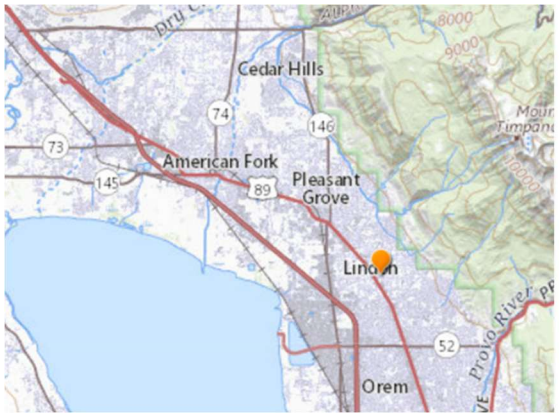
Site Objective: This site is established to determine population exposure to ozone in Washington County
Does the site meet the objective? Yes, all objectives are met.

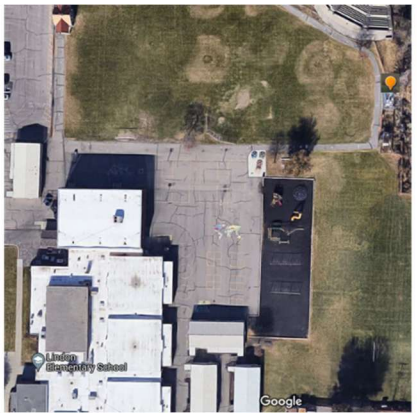
Site Description: This site is located behind the Hurricane City offices
Can data from this site be used to evaluate NAAQS? Yes

Gaseous/Particulate Parameters

Parameter	Sampling & Analysis Method	Operating Schedule	Monitoring Objective	Spatial Scale
Nitrogen Dioxide	Gas Phase Chemiluminescence	Continuous	Population Exposure	SLAMS- Population Neighborhood
Ozone	Ultraviolet	Continuous	Population Exposure	SLAMS-High Neighborhood
$PM_{2.5}$ Real Time	Synchronized Hybrid Ambient Real Time Particulate Monitor	Continuous	Air Quality Index	SLAMS- Population Neighborhood

Meteorological Parameters				
Parameter	**Sampling & Analysis Method**	**Operating Schedule**	**Tower Height**	**Spatial Scale**
Relative Humidity	Air Temperature and Relative Humidity Sensor- Electronic Thin Film	Continuous	10 meters	Urban
Ambient Temperature	Air Temperature and Relative Humidity Sensor- Electronic Resistance	Continuous	10 meters	Urban
Wind Direction	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Wind Speed	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Ambient Pressure	Barometric Pressure Transducer	Continuous	2 meters	Urban
WD Sigma	Electronic EPA Method	Continuous	10 meters	Urban
Solar Radiation	Solar Radiation sensor	Continuous	10 meters	Urban





Site:	Lindon (LN)	Longitude:	-111.713486	Station Type:	SLAMS
AQS#:	49-049-4001	**Latitude:**	40.339505	**MSA:**	Provo - Orem
Address:	50 North Main	**Elevation (m):**	1444		
City:	Lindon				
County:	Utah				

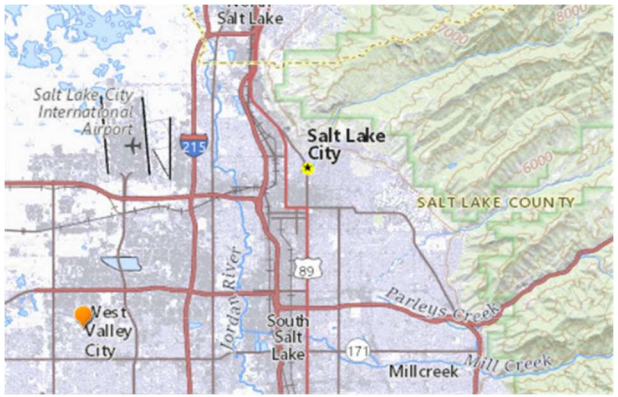
Site Objective: This site is established to determine PM emissions from commercial and industrial sources. Historically, this site has reported the highest PM values in Utah County
Does the site meet the objective? Yes, all objectives are met.

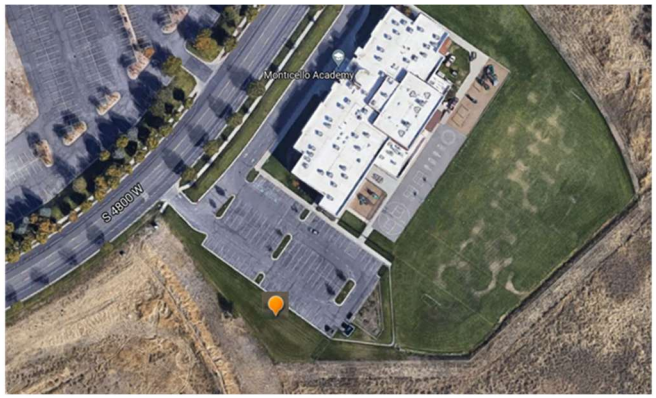
Site Description: The site is located at the Lindon Elementary School in the City of Lindon, Utah County
Can data from this site be used to evaluate NAAQS? Yes

Gaseous/Particulate Parameters

Parameter	Sampling & Analysis Method	Operating Schedule	Monitoring Objective	Spatial Scale
Nitrogen Dioxide	Gas Phase Chemiluminescence	Continuous	Population Exposure	SLAMS- Population Neighborhood
Ozone	Ultraviolet	Continuous	Population Exposure	SLAMS-High Neighborhood
Carbon Monoxide	Gas Phase Correlation	Continuous	Population Exposure	SLAMS-High Neighborhood

$PM_{2.5}$ Real Time	Synchronized Hybrid Ambient Real Time Particulate Monitor	Continuous	Air Quality Index	SLAMS- Population Neighborhood
$PM_{2.5}$	Manual Gravimetric	Daily	Population Exposure	SLAMS- Population
$PM_{2.5}$	Manual Gravimetric Co-located	1 in 6 days	Precision and Accuracy Assessment	SLAMS- Population
$PM_{2.5}$ Speciation	Manual EPA CSN	1 in 6 days	Population Exposure	SLAMS- Population
PM_{10}	Manual Gravimetric	Daily	Population Exposure	SLAMS-Impact Neighborhood
PM_{10} Real Time	Beta Attenuation Mass Monitor	Continuous	Air Quality Index	SLAMS- Population Neighborhood
Black Carbon	Aethalometer	Continuous	Population Exposure	SLAMS- Population Neighborhood
Meteorological Parameters				
Parameter	**Sampling & Analysis Method**	**Operating Schedule**	**Tower Height**	**Spatial Scale**
Relative Humidity	Air Temperature and Relative Humidity Sensor- Electronic Thin Film	Continuous	10 meters	Urban
Ambient Temperature	Air Temperature and Relative Humidity Sensor- Electronic Resistance	Continuous	10 meters	Urban
Wind Direction	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Wind Speed	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Ambient Pressure	Barometric Pressure Transducer	Continuous	10 meters	Urban
WD Sigma	Electronic EPA Method	Continuous	10 meters	Urban
Solar Radiation	Solar Radiation sensor	Continuous	10 meters	Urban





Site:	Lake Park (LP)	Longitude:	-112.008684	Station Type:	SLAMS
AQS#:	49-035-3014	**Latitude:**	40.709905	**MSA:**	Salt Lake City
Address:	2782 South Corporate Park Dr.	**Elevation (m):**	1295		
City:	West Valley City				
County:	Salt Lake				

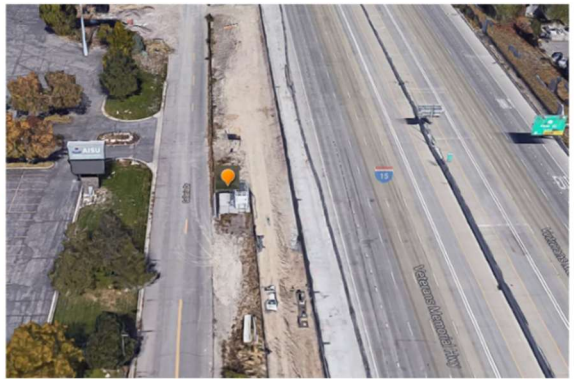
Site Objective: This site recently established to determine the potential impact of the Inland Port on the Salt Lake Valley Airshed.
Does the site meet the objective? Yes, all objectives are met.

Site Description: This site is located near the parking lot of Monticello Academy in West Valley City, Salt Lake County.
Can data from this site be used to evaluate NAAQS? Yes

Gaseous/Particulate Parameters

Parameter	Sampling & Analysis Method	Operating Schedule	Monitoring Objective	Spatial Scale
Nitrogen Dioxide	Gas Phase Chemiluminescence	Continuous	Population Exposure	SLAMS- Population Neighborhood
Ozone	Ultraviolet	Continuous	Population Exposure	SLAMS- Population Neighborhood
$PM_{2.5}$ Real Time	Synchronized Hybrid Ambient Real Time Particulate Monitor	Continuous	Air Quality Index	SLAMS- Population Neighborhood
Black Carbon	Aethalometer	Continuous	Population Exposure	SLAMS- Population Neighborhood

Meteorological Parameters				
Parameter	**Sampling & Analysis Method**	**Operating Schedule**	**Tower Height**	**Spatial Scale**
Relative Humidity	Air Temperature and Relative Humidity Sensor- Electronic Thin Film	Continuous	10 meters	Urban
Ambient Temperature	Air Temperature and Relative Humidity Sensor- Electronic Resistance	Continuous	10 meters	Urban
Wind Direction	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Wind Speed	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Ambient Pressure	Barometric Pressure Transducer	Continuous	10 meters	Urban
WD Sigma	Electronic EPA Method	Continuous	10 meters	Urban
Solar Radiation	Solar Radiation sensor	Continuous	10 meters	Urban




Site:	Near Road (NR)	Longitude:	-111.901874	Station Type:	SLAMS
AQS#:	49-035-4002	**Latitude:**	40.662868	**MSA:**	Salt Lake City
Address:	5001 South Galleria Dr.	**Elevation (m):**	1305		
City:	Murray				
County:	Salt Lake				

Site Objective: This site recently established to assess population exposure to and to monitor vehicular contribution to air pollution as part of the EPA NO_2 monitoring
Does the site meet the objective? Yes, all objectives are met.

Site Description: A site was found for the Near Road monitor on I-15 at the address 4951 South Galleria Dr, Murray
Can data from this site be used to evaluate NAAQS? Yes

Gaseous/Particulate Parameters

Parameter	Sampling & Analysis Method	Operating Schedule	Monitoring Objective	Spatial Scale
Nitrogen Dioxide	Gas Phase Chemiluminescence	Continuous	Population Exposure	SLAMS- Population Neighborhood
Ozone	Ultraviolet	Continuous	Population Exposure	SLAMS- Population Neighborhood
Carbon Monoxide	Gas Phase Correlation	Continuous	Population Exposure	SLAMS-High Neighborhood
$PM_{2.5}$ Real Time	Synchronized Hybrid Ambient Real Time Particulate Monitor	Continuous	Air Quality Index	SLAMS- Population Neighborhood
$PM_{2.5}$	Manual Gravimetric	Daily	Population Exposure	SLAMS- Population


Site:	Price #2 (P2)	Longitude:	-110.770097	Station Type:	SPM
AQS#:	49-007-1003	**Latitude:**	39.595749	**MSA:**	Price
Address:	351 South 2500 East	**Elevation (m):**	1737		
City:	Price				
County:	Carbon				

Site Objective: This site is established in response to a three-state ozone study. It is funded by the Bureau of Land Management
Does the site meet the objective? Yes, all objectives are met.

Site Description: This site is located in a farm field 3.6 Km east of Price
Can data from this site be used to evaluate NAAQS? Yes

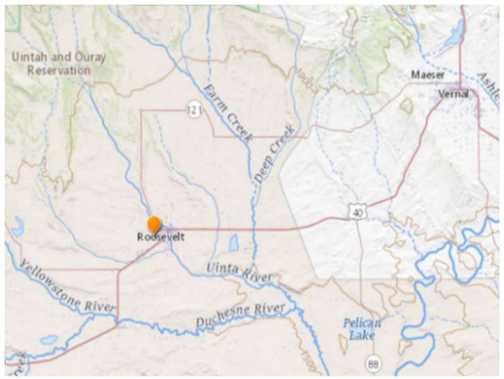
Gaseous/Particulate Parameters

Parameter	Sampling & Analysis Method	Operating Schedule	Monitoring Objective	Spatial Scale
Nitrogen Dioxide	Gas Phase Chemiluminescence	Continuous	Population Exposure	SLAMS- Population Neighborhood
Ozone	Ultraviolet	Continuous	Population Exposure	SLAMS-High Neighborhood

Meteorological Parameters

Parameter	Sampling & Analysis Method	Operating Schedule	Tower Height	Spatial Scale
Relative Humidity	Air Temperature and Relative Humidity Sensor- Electronic Thin Film	Continuous	10 meters	Regional

Ambient Temperature	Air Temperature and Relative Humidity Sensor- Electronic Resistance	Continuous	10 meters	Regional
Wind Direction	2D-ultrasonic anemometer transducers	Continuous	10 meters	Regional
Wind Speed	2D-ultrasonic anemometer transducers	Continuous	10 meters	Regional
Ambient Pressure	Barometric Pressure Transducer	Continuous	10 meters	Regional
WD Sigma	Electronic EPA Method	Continuous	10 meters	Regional
Solar Radiation	Solar Radiation sensor	Continuous	10 meters	Regional




Site:	Roosevelt (RS)	Longitude:	-110.008961	Station Type:	SPM
AQS#:	49-013-0002	**Latitude:**	40.294175	**MSA:**	NA
Address:	290 South 1000 West	**Elevation (m):**	1585		
City:	Roosevelt				
County:	Duchesne				

Site Objective: This site is established to determine maximum ozone and $PM_{2.5}$ concentrations in Duchesne County
Does the site meet the objective? Yes, all objectives are met.

Site Description: The site is located in the city park North West section of Roosevelt.
Can data from this site be used to evaluate NAAQS? Yes

Gaseous/Particulate Parameters

Parameter	Sampling & Analysis Method	Operating Schedule	Monitoring Objective	Spatial Scale
Nitrogen Dioxide	Gas Phase Chemiluminescence	Continuous	High Ozone Winter Study	Regional
Ozone	Ultraviolet	Continuous	High Ozone Winter Study	Regional
$PM_{2.5}$ Real Time	Synchronized Hybrid Ambient Real Time Particulate Monitor	Continuous	Air Quality Index	Regional

$PM_{2.5}$ Real Time	Synchronized Hybrid Ambient Real Time Particulate Monitor Co-located	Continuous	Precision and Accuracy	SLAMS- Population Neighborhood
$PM_{2.5}$	Manual Gravimetric	Daily	Population Exposure	SLAMS- Population
PM_{10}	Manual Gravimetric	Daily	Population Exposure	SLAMS-Impact Neighborhood
PM_{10}	Manual Gravimetric Co-located	1 in 6 days	Precision and Accuracy Assessment	SLAMS- Population
PM_{10} Real Time	Beta Attenuation Mass Monitor	Continuous	Air Quality Index	SLAMS- Population Neighborhood
Meteorological Parameters				
Parameter	**Sampling & Analysis Method**	**Operating Schedule**	**Tower Height**	**Spatial Scale**
Relative Humidity	Air Temperature and Relative Humidity Sensor- Electronic Thin Film	Continuous	10 meters	Urban
Ambient Temperature	Air Temperature and Relative Humidity Sensor- Electronic Resistance	Continuous	10 meters	Urban
Wind Direction	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Wind Speed	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Ambient Pressure	Barometric Pressure Transducer	Continuous	10 meters	Urban
WD Sigma	Electronic EPA Method	Continuous	10 meters	Urban
Solar Radiation	Solar Radiation sensor	Continuous	10 meters	Urban
Ambient Temperature	Elec. Resistance	Continuous	2 meters	Urban
Temperature Difference	Math Channel	Continuous	2 meters	Urban


Site:	Rose Park (RP)	Longitude:	-111.930996	Station Type:	SLAMS
AQS#:	49-035-3010	**Latitude:**	40.795514	**MSA:**	Salt Lake City
Address:	1250 North 1400 West	**Elevation (m):**	1283		
City:	Salt Lake City				
County:	Salt Lake				

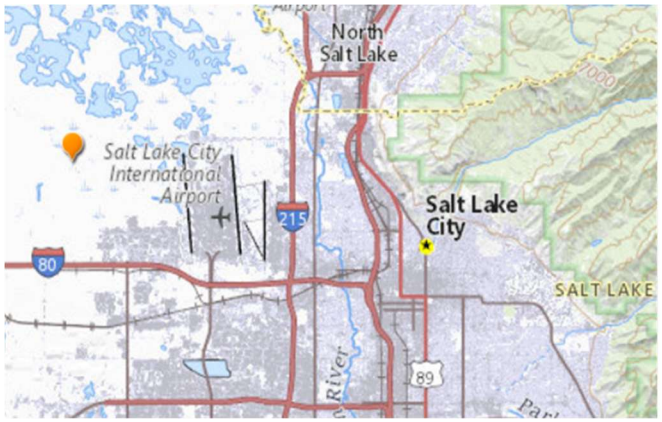
Site Objective: This site is established to better represent PM2.5 exposure in this area of Salt Lake City
Does the site meet the objective? Yes, all objectives are met.

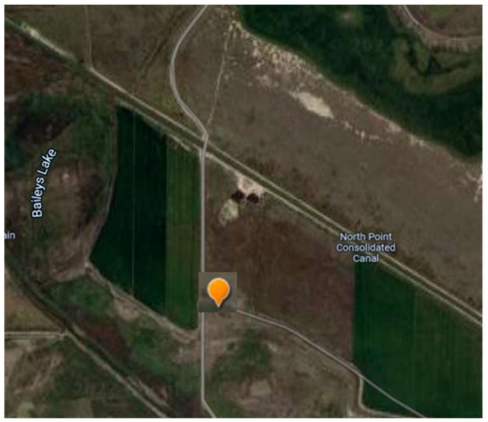
Site Description: The site is located in the community of Rose Park at the north end of Salt Lake City, Salt Lake County
Can data from this site be used to evaluate NAAQS? Yes

Gaseous/Particulate Parameters

Parameter	Sampling & Analysis Method	Operating Schedule	Monitoring Objective	Spatial Scale
Nitrogen Dioxide	Gas Phase Chemiluminescence	Continuous	Population Exposure	SLAMS- Population Neighborhood
Ozone	Ultraviolet	Continuous	Population Exposure	SLAMS- Population Neighborhood
Carbon Monoxide	Gas Phase Correlation	Continuous	Population Exposure	SLAMS- Population Neighborhood
Sulfur Dioxide	Pulsed Fluorescence	Continuous	Population Exposure	SLAMS- Population Neighborhood
$PM_{2.5}$ Real Time	Synchronized Hybrid Ambient Real Time Particulate Monitor	Continuous	Air Quality Index	SLAMS- Population Neighborhood

$PM_{2.5}$	Manual Gravimetric	Daily	Population Exposure	SLAMS- Population
$PM_{2.5}$	Manual Gravimetric Co-located	Daily	Precision and Accuracy Assessment	SLAMS- Population
Meteorological Parameters				
Parameter	**Sampling & Analysis Method**	**Operating Schedule**	**Tower Height**	**Spatial Scale**
Relative Humidity	Air Temperature and Relative Humidity Sensor- Electronic Thin Film	Continuous	10 meters	Urban
Ambient Temperature	Air Temperature and Relative Humidity Sensor- Electronic Resistance	Continuous	10 meters	Urban
Wind Direction	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Wind Speed	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Ambient Pressure	Barometric Pressure Transducer	Continuous	10 meters	Urban
WD Sigma	Electronic EPA Method	Continuous	10 meters	Urban
Solar Radiation	Solar Radiation sensor	Continuous	10 meters	Urban





Site:	Saltair (SA)	Longitude:	-112.049804	Station Type:	SPM
AQS#:	49-035-3005	**Latitude:**	40.805989	**MSA:**	Salt Lake City
Address:	No street address	**Elevation (m):**	1289		
City:	Salt Lake City				
County:	Salt Lake				

Site Objective: This site is established to collect meteorological information for air quality models
Does the site meet the objective? Yes, all objectives are met.

Site Description: The site is located west of the Salt Lake Airport in Salt Lake County**.**
Can data from this site be used to evaluate NAAQS? No

Meteorological Parameters

Parameter	Sampling & Analysis Method	Operating Schedule	Tower Height	Spatial Scale
Relative Humidity	Elec. Thin Film	Continuous	10 meters	Urban
Ambient Temperature	Elec. Resistance	Continuous	10 meters	Urban
Wind Direction	Elec. Resistance Level 1	Continuous	10 meters	Urban
WD Sigma	Elec. EPA Method	Continuous	10 meters	Urban
Wind Speed	Elec. Chopped Signal Level 1	Continuous	10 meters	Urban
Solar Radiation	Elec. LiCor	Continuous	2 meters	Urban


Site:	Smithfield (SM)	Longitude:	-111.852064	Station Type:	SLAMS
AQS#:	49-005-0007	**Latitude:**	41.84267	**MSA:**	Logan
Address:	675 West 220 North	**Elevation (m):**	1379		
City:	Smithfield				
County:	Cache				

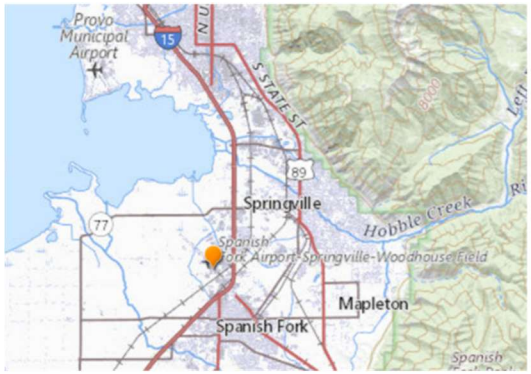
Site Objective: Site established to replace Logan site and determine general population exposure.
Does the site meet the objective? Yes, all objectives are met.

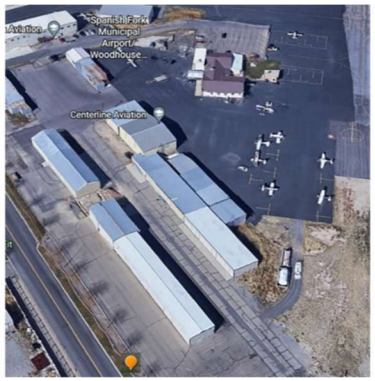
Site Description: This site is located at Birch Creek Elementary School in Cache County. It is approximately 7 miles north of Logan
Can data from this site be used to evaluate NAAQS? Yes

Gaseous/Particulate Parameters

Parameter	Sampling & Analysis Method	Operating Schedule	Monitoring Objective	Spatial Scale
Nitrogen Dioxide	Gas Phase Chemiluminescence	Continuous	Population Exposure	SLAMS- Population Neighborhood
Ozone	Ultraviolet	Continuous	Population Exposure	SLAMS- Population Neighborhood
$PM_{2.5}$ Speciation	Manual EPA CSN	1 in 6 days	Population Exposure	SLAMS- Population Neighborhood
$PM_{2.5}$ Real Time	Synchronized Hybrid Ambient Real Time Particulate Monitor	Continuous	Precision and Accuracy	SLAMS- Population Neighborhood

$PM_{2.5}$ Real Time	Synchronized Hybrid Ambient Real Time Particulate Monitor Co-located	Continuous	Precision and Accuracy	SLAMS- Population Neighborhood
$PM_{2.5}$	Manual Gravimetric	Daily	Population Exposure	SLAMS- Population Neighborhood
$PM_{2.5}$	Manual Gravimetric Co-located	Daily	Precision and Accuracy Assessment	SLAMS- Population Neighborhood
Black Carbon	Aethalometer	Continuous	Population Exposure	SLAMS- Population Neighborhood
Meteorological Parameters				
Parameter	**Sampling & Analysis Method**	**Operating Schedule**	**Tower Height**	**Spatial Scale**
Relative Humidity	Air Temperature and Relative Humidity Sensor- Electronic Thin Film	Continuous	10 meters	Urban
Ambient Temperature	Air Temperature and Relative Humidity Sensor- Electronic Resistance	Continuous	10 meters	Urban
Wind Direction	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Wind Speed	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Ambient Pressure	Barometric Pressure Transducer	Continuous	10 meters	Urban
WD Sigma	Electronic EPA Method	Continuous	10 meters	Urban
Solar Radiation	Solar Radiation sensor	Continuous	10 meters	Urban





Site:	Spanish Fork (SF)	Longitude:	-111.658011	Station Type:	SLAMS
AQS#:	49-049-5010	**Latitude:**	40.136369	**MSA:**	Provo - Orem
Address:	300 West 2050 North	**Elevation (m):**	1380		
City:	Spanish Fork				
County:	Utah				

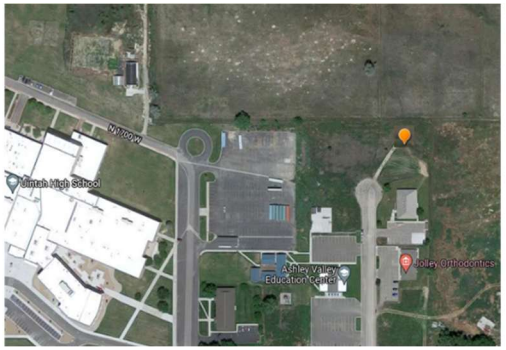
Site Objective: This site is established to determine the boundary of the high ozone and $PM_{2.5}$ concentrations in Utah County.
Does the site meet the objective? Yes, all objectives are met.

Site Description: The site is located at the Spanish Fork airport in the city of Spanish Fork, Utah County.
Can data from this site be used to evaluate NAAQS? Yes

Gaseous/Particulate Parameters

Parameter	Sampling & Analysis Method	Operating Schedule	Monitoring Objective	Spatial Scale
Nitrogen Dioxide	Gas Phase Chemiluminescence	Continuous	Population Exposure	SLAMS- Population Neighborhood
Ozone	Ultraviolet	Continuous	Population Exposure	SLAMS- Population Neighborhood
$PM_{2.5}$ Real Time	Synchronized Hybrid Ambient Real Time Particulate Monitor	Continuous	Air Quality Index	SLAMS- Population Neighborhood
$PM_{2.5}$	Manual Gravimetric	Daily	Population Exposure	SLAMS- Population Neighborhood

Meteorological Parameters				
Parameter	**Sampling & Analysis Method**	**Operating Schedule**	**Tower Height**	**Spatial Scale**
Relative Humidity	Air Temperature and Relative Humidity Sensor- Electronic Thin Film	Continuous	10 meters	Urban
Ambient Temperature	Air Temperature and Relative Humidity Sensor- Electronic Resistance	Continuous	10 meters	Urban
Wind Direction	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Wind Speed	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Ambient Pressure	Barometric Pressure Transducer	Continuous	10 meters	Urban
WD Sigma	Electronic EPA Method	Continuous	10 meters	Urban
Solar Radiation	Solar Radiation sensor	Continuous	10 meters	Urban



Site:	Vernal (V4)	Longitude:	-109.560731	Station Type:	SLAMS
AQS#:	49-047-1004	**Latitude:**	40.464812	**MSA:**	NA
Address:	628 North 1700 West	**Elevation (m):**	1667		
City:	Vernal				
County:	Uintah				

Site Objective: This site is established was set up in response to an ozone study.
Does the site meet the objective? Yes, all objectives are met.

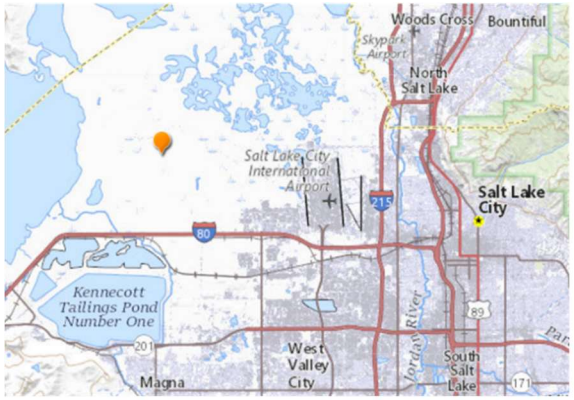
Site Description: The site is located at the northwest of the city of Vernal.

Can data from this site be used to evaluate NAAQS? Yes

Gaseous/Particulate Parameters

Parameter	Sampling & Analysis Method	Operating Schedule	Monitoring Objective	Spatial Scale
Nitrogen Dioxide	Gas Phase Chemiluminescence	Continuous	Population Exposure	Regional
Ozone	Ultraviolet	Continuous	Population Exposure	Regional
$PM_{2.5}$ Real Time	Synchronized Hybrid Ambient Real Time Particulate Monitor	Continuous	Air Quality Index	SLAMS-Population
$PM_{2.5}$	Manual Gravimetric	Daily	Population Exposure	SLAMS- Population Neighborhood

Meteorological Parameters				
Parameter	**Sampling & Analysis Method**	**Operating Schedule**	**Tower Height**	**Spatial Scale**
Relative Humidity	Air Temperature and Relative Humidity Sensor- Electronic Thin Film	Continuous	10 meters	Regional
Ambient Temperature	Air Temperature and Relative Humidity Sensor- Electronic Resistance	Continuous	10 meters	Regional
Wind Direction	2D-ultrasonic anemometer transducers	Continuous	10 meters	Regional
Wind Speed	2D-ultrasonic anemometer transducers	Continuous	10 meters	Regional
Ambient Pressure	Barometric Pressure Transducer	Continuous	2 meters	Regional
WD Sigma	Electronic EPA Method	Continuous	10 meters	Regional
Solar Radiation	Solar Radiation sensor	Continuous	10 meters	Regional




Site:	ZZ	Longitude:	-112.087772	Station Type:	SPM
AQS#:	49-035-3016	**Latitude:**	40.80793	**MSA:**	Salt Lake City
Address:	8000 W 1480 N	**Elevation (m):**	1287		
City:	Salt Lake City				
County:	Salt Lake				

Site Objective: This site recently established to determine the potential impact of the Inland Port on the Salt Lake Valley Airshed.
Does the site meet the objective? Yes, all objectives are met.

Site Description: This site is located at the new State Prison north of I-80 on the southern border of the Great Salt Lake in Salt Lake County
Can data from this site be used to evaluate NAAQS? Yes

Gaseous/Particulate Parameters

Parameter	Sampling & Analysis Method	Operating Schedule	Monitoring Objective	Spatial Scale
Nitrogen Dioxide	Gas Phase Chemiluminescence	Continuous	Population Exposure	SLAMS- Population Neighborhood
Ozone	Ultraviolet	Continuous	Population Exposure	SLAMS- Population Neighborhood
$PM_{2.5}$ Real Time	Synchronized Hybrid Ambient Real Time Particulate Monitor	Continuous	Air Quality Index	SLAMS- Population Neighborhood
Black Carbon	Aethalometer	Continuous	Population Exposure	SLAMS- Population Neighborhood

Meteorological Parameters				
Parameter	**Sampling & Analysis Method**	**Operating Schedule**	**Tower Height**	**Spatial Scale**
Relative Humidity	Air Temperature and Relative Humidity Sensor- Electronic Thin Film	Continuous	10 meters	Urban
Ambient Temperature	Air Temperature and Relative Humidity Sensor- Electronic Resistance	Continuous	10 meters	Urban
Wind Direction	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Wind Speed	2D-ultrasonic anemometer transducers	Continuous	10 meters	Urban
Ambient Pressure	Barometric Pressure Transducer	Continuous	10 meters	Urban
WD Sigma	Electronic EPA Method	Continuous	10 meters	Urban
Solar Radiation	Solar Radiation sensor	Continuous	10 meters	Urban

2. Response to Public Comments

This year we are pleased that the majority of the comments are suggesting changes or additions that we agree with and in many cases already have plans in place to implement. We appreciate the time and effort of all commenters in providing these comments and we feel this makes the air monitoring network better and more efficient.

1. Comment - The PM10 monitoring data (current and trends) needs to be published on the UDAQ website daily.

   Response - Real time PM10 data is currently being tested and evaluated across the network. Once we are confident that the data is reliable and in good form we may adjust the web pages. At present all of the real time PM10 data can be found on the trend charts under the PM10 tab. This data is published to the web page automatically every hour.

2. Comment - There should be another air toxics monitor in the Salt Lake Metro area given EJ concerns and ongoing exceptional event concerns. These data also need to be published routinely to the UDAQ site so we have a near real-time understanding of their impacts and a single monitoring site is not sufficient.

   Response - The Air Toxics site is operated as a part of the National Air Toxics Trend Site (NATTS) program which is run by EPA. These samples are primarily filter or canister-based and the results are usually not available prior to 6 months from the sample date. The data from these samples is available on the NAATTS site https://www3.epa.gov/ttnamti1/natts.html. At present there are no rules related to toxics and it is unclear how the addition of another similar site would be the best use of scarce resources.

3. Comment - Additional FRM monitors should be co-located with continuous PM2.5 monitors at the prison site and the Lake Park site as well as any future sites that might otherwise just have continuous PM2.5 measurements.

   Response - The PM2.5 monitoring at the Lake Park and Prison sites are collected daily. We agree that FRM monitors should be placed at these sites and will look for an opportunity to add them in the future. The Prison site was under construction during the last year and that will also impact data and is not expected to continue into the future. Additional resources will also have to be available to make this adjustment.

4. Comment - Consider a location in the western part of the Salt Lake Valley for the second Near Road site or for a new monitor site under the Enhanced Monitoring Plan (EMP).

Response - Near road monitoring is required at specific locations that meet the CFR and those locations are along the I-15 corridor. Potential nearroad sites have been evaluated and we are working with EPA to determine the exact location of the site. The EMP sites are being evaluated and have yet to be determined. Looking for one or more sites in the west side of the valley is a priority as the commenter suggested.

5. Comment - Two comments were received that basically requested that additional PAMS sites be established along the Wasatch Front as part of the EMP. These sites should include monitoring for Volatile Organic Compound (VOC) and additional monitoring for formaldehyde, atmospheric mixing height measurements and a temperature profiler if possible as part of the EMP.

   Response - Due to Legislative actions in the past session, funding was appropriated to expand the PAMS monitoring network as part of the Enhanced Monitoring Plan (EMP). Additional monitoring sites to meet PAMS requirements are planned for numerous locations in the Wasatch Front Nonattainment Area; some of these sites will have VOC, formaldehyde measurements and mixing height measurements. A temperature profiler may be available but will have to be evaluated as to where to locate it.

6. Comment - Comments were received about some clarification and editorial issues with the network plan.

   Response - The following footnote was added to table 3 to improve clarity. “Co-located means an additional monitor(s) that can either be of the same type or of a different type. It can be an FRM and an FEM or a pair of FRM's or a pair of FEM's or in some cases it may also mean a third or fourth monitor at the same location.”